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DFID's Manufacturing Portfolio Review

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Department
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DFID'S MANUFACTURING PORTFOLIO REVIEW



SYNTHESIS AND RECOMMENDATIONS FOR DEVELOPING MANUFACTURING SUPPORT PROGRAMMES (Activity C)

SEPTEMBER 2019

EXPERT ADVISORY CALLDOWN SERVICE, LOT C



PREAMBLE

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EXECUTIVE SUMMARY

Sustained economic growth in developing countries typically requires structural transformation, which involves the movement of resources, including labour and financial capital, from low to higher productivity activities. The market is the basic mechanism for resource reallocation into the manufacturing sector accordingly. Scientific and policy studies, however, suggest that governments must play an active role in coordinating investments for industrial upgrading and diversification. Against this background, DFID has acknowledged the importance of the development of the manufacturing sector within the countries in which DFID has a presence and is able to support structural transformation by increasing manufacturing productivity and the share that manufacturing contributes to GDP.

Global trends in the past decades show that China emerged as the global factory of the world. However, the recent trend is the decline in the share of manufacturing in global GDP paralleled by an expansion in the corresponding share of services. A related recent trend is ongoing deindustrialization in almost all advanced economies including China as well as Africa and Asia. Moreover, production jobs have moved to developing countries that are trapped in low-value-added activities and are locked out of the higher value-added activities in design, key technological inputs, and marketing.

Although the manufacturing sector is often discussed as one sector in theory and policy and programme practice, in reality the sector is a heterogeneous collection of subsectors with differences in terms of products, technology and requirements as well as growth opportunities and societal impacts. Different subsectors imply different factor/input intensities, output markets, claims on infrastructure and short and long development prospects. Focusing on priority manufacturing subsectors in support programmes is an effective approach applied by leading donors and MOs.

Upgrading the industrial structure in a given country's subsector requires the upgrading of the factor endowment structure from one that is relatively abundant in labour and natural resources to one that is relatively abundant in capital, the introduction of new technologies, and the corresponding improvement in infrastructure to facilitate economic operations. Both domestic investment and foreign direct investment (FDI) investments can be strong complements.

Countries and their manufacturing subsectors differ in their attraction to investments. Market-seeking investments might lead to higher local employment, but less international trade, whereas efficiency-seeking investments might lead to both more employment and more international trade. Efficiency-seeking FDI is particularly important for countries looking to integrate into the global economy and move up the value chain. Efficiency-seeking FDI is not only export-oriented, but also key to export diversification. Which position to take in the subsector selection, based on investment attraction, depends on the strategic choices and priorities in the broader development framework of the country in question.

The development of a manufacturing programme framework starts with further assessment of the prospects and opportunities for selected subsectors. One way of selecting promising manufacturing subsectors is based on the comparative advantages determined. It is important to signal that comparative advantage is dynamic and changes over time. The complementing product space concept is the probability that a country will develop the capability to be good at producing one good based on the existing capability in the production of another similar, or nearby goods. The identification of the binding constraints, that hamper the subsector's growth, could be addressed by applying an adapted

version Hausmann growth-diagnostic model. The complementing ‘enterprise map’ approach provides the suitable research tools.

In the design of the log frame approaches and methodology, it is essential to include manufacturing-specific indicators, both in programmes with a primary focus on manufacturing and generic private sector development programmes. Generic private sector support inputs, such as improving finance, infrastructure and the business climate, are critical for business in general, and for manufacturing as well. In addition, there are support inputs such as production technology, product manufacturing standards, subsector-focused integration in global value chains that relate more to manufacturing. The most evident (and used) measures of structural transformation are GDP, value added, employment, investment and export. The log frame inputs promoting manufacturing involve a comprehensive approach addressing various issues at various levels at the same time.

Safeguarding society from harmful impacts as a result of manufacturing development is a prerequisite. Manufacturing programmes should explicitly promote gender equality. While women’s ownership in smallholder enterprises is widely seen in the informal sector in most developing countries, it is less common in more advanced and larger manufacturing industries. Likewise, the representation of women in higher executive and management positions, including the higher qualified technical engineering jobs, is limited. A related priority in the context of manufacturing promotion is creating stable jobs while safeguarding labour conditions and labour rights. Challenging working conditions in developing countries pose one of the more urgent questions around manufacturing promotion. Child labour is another notorious issue with regard to labour conditions in manufacturing. Promoting manufacturing often implies adverse environmental consequences through the release of air and water pollutants and the disposal of hazardous wastes.

Regarding organisational implications, there is a large variation in DFID’s spending on manufacturing support programmes across countries. As DFID aims to develop a more substantial portfolio of manufacturing support programmes, more programmes with a primary and explicit focus on manufacturing are to be initiated and implemented. DFID country offices may increase their manufacturing spend for instance to average level of 10-15% of the overall country budget for economic development. With the exception of the fragile states and conflict areas (Yemen and South Sudan for instance), increased manufacturing activity is likely to be appropriate in Caribbean, DR Congo, Indonesia, Jordan, Kyrgyz republic, Lebanon, Malawi, Mozambique Myanmar, Pakistan, Tajikistan, Tanzania and Sierra Leone.

Explicit internal coordination of manufacturing programmes, in particular the collection and sharing of economic data on subsectors and indicators, will assure an effective realisation of DFID’s ambitions. A logical step could be the establishment of an internal coordination point/platform within DFID that shares information and comparable insights of manufacturing programmes and the associated support approaches, best practices and so forth. Other donors and MOs work in a broad range of comparable areas and activities in manufacturing support. There is no formalized overarching coordination framework. DFID is well positioned to set up a coordination initiative.

Introduction

Sustained economic growth in developing countries will not happen without structural transformation, which involves the movement of resources from low to higher productivity activities. Manufacturing plays a key role in this given it offers an opportunity for access to new technologies, development of skills and – through exports – a source of foreign exchange and access to large global markets. There is an important role for Governments to actively coordinate and facilitate investments for industrial upgrading and diversification.

Over the past decades, development economists such as Hollis Chenery, and more recently Justin Yifu Lin, Dani Rodrik and Joseph Stiglitz have emphasized that sustained economic growth in developing countries cannot happen without structural changes in terms of economic industrial and services sectors. They stress the importance of structural transformation at the core of development debate.¹ This idea entails that an economy's structure of factor endowments evolves from one stage of development to another and requires ongoing structural transformation. Moreover, this transformation is not a dichotomy of two economic development stages ("poor" versus "rich" or "developing" versus "industrialized"); each stage of economic development is a point along the continuum from a low-income agrarian economy to a high-income industrialized economy. The key idea is that the market is the basic mechanism for effective resource allocation. In addition to an effective market mechanism, they argue the Government should play an active role in facilitating industrial upgrading and infrastructure improvements.

Structural transformation involves the movement of resources, including labour and financial capital, from low to higher productivity activities which, in turn, create better-paying jobs, raise incomes and reduce poverty. In order to create wealthy nations, structural transformation in terms of agricultural activity shifting towards manufacturing activity is essential. All countries that remain poor have failed to achieve structural transformation, that is, they have been unable to diversify away from agriculture and the production of traditional goods into manufacturing and other modern activities.

Thus, a robust manufacturing sector² is broadly understood as a fundamental path to economic growth and development.³ Manufacturing is assumed to be more dynamic than other sectors. Technological advance is concentrated in the manufacturing sector and diffuses from there to other economic sectors such as the service sector. It also provides the discipline needed for the labor force of a modern economy. Compared to agriculture and services, the argument runs that the manufacturing sector offers special opportunities for economies of scale and capital accumulation. Capital accumulation can be more easily realised in technology intensive and spatially concentrated manufacturing than in spatially dispersed agriculture.

Moreover, export-oriented manufacturing, though FDI, forces firms to become internationally competitive instead of being protected within small domestic markets. It also allows firms to earn

¹ Lin, J. Y. 2012. *New Structural Economics: A Framework for Rethinking Development and Policy*. Washington, DC: World Bank.

² Manufacturing is defined as the physical or chemical transformation of materials or components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail. Included are assembly of component parts of manufactured products and recycling of waste materials. Source: <https://stats.oecd.org/glossary/detail.asp?ID=1586>.

³ Cornwall, John. 1977. *Modern Capitalism: Its Growth and Transformation*. New York: St. Martin's Press.

foreign exchange and brings the potential for rapid expansion into deep global markets.⁴ Exporting firms could also adapt their activities by copying the example presented through FDI.⁵

In Sub-Saharan Africa, which constitutes the core of the development challenge today, and low-income countries in Asia, agriculture continues to play a dominant role, accounting for 63 percent of the labour force. Its share of manufacturing in 2005 was lower than in 1965 (Lin 2011). Recent empirical work confirms that the bulk of the difference in growth between Asia and developing countries in Latin America and Africa can be explained by the contribution of structural change to overall labour productivity (McMillan and Rodrik 2011). Economies such as China, India and Indonesia have risen into the top ranks of global manufacturing and in the world's 15 largest manufacturing economies.⁶ However, this narrative seems to exclude many African nations. Despite their manufacturing potential and promising trajectories, most African countries have a relative dearth of factories. This limited industrial development represents a missed opportunity for economic transformation and quality employment generation that alleviates poverty. The Brookings Institute suggests that Africa becomes the world's next great manufacturing centre, potentially capturing part of the 100 million labour-intensive manufacturing jobs that will leave China by 2030 because of increased wages.⁷

Traditional heavy manufacturing - 'smokestack industry' - was regarded as the key driver of structural transformation. However, economists John Page and Finn Tarp, amongst others, suggest that a broader definition of the higher productivity 'modern sector' is needed in thinking about structural transformation in Africa.⁸ Light manufacturing⁹ as well as modern tradable services, such as ICT-based services, tourism, and transport and logistics, have the potential for strong within-sector productivity change and can contribute to raising productivity in other sectors of the economy. It should be noted that automation and modern services are to only be applicable to middle income countries and not to low income countries (or lower middle income countries) where the issue of job creation is critical and labor skills are too low.¹⁰ This suggests that low income countries are only able to develop through industrialization. Agro-industrial production and horticulture offer the potential for productivity growth and exports. Some of these industries have the capacity to absorb large shares of Africa's growing urban labour force. It is possible that these industries offer the potential for a new—or at least complementary—path towards structural transformation.

As mentioned, the market should be the basic mechanism for resource allocation, but that governments in Africa and Asia (supported by donors such as DFID amongst other) must play an active role in coordinating investments for industrial upgrading and diversification. DFID policy does acknowledge

⁴ Rodrik, D. 2012. Unconditional Convergence in Manufacturing. *Quarterly Journal of Economics* 128 (1): 165-205.

⁵ Lea, N. 2019. *Ethiopia's industrial baby and the macroeconomic bathwater*. DFID Chief Economist's Office Country Note. London: DFID.

⁶ McKinsey Global Institute. 2012. *Manufacturing the future: The next era of global growth and innovation*. <https://www.mckinsey.com/business-functions/operations/our-insights/the-future-of-manufacturing>

⁷ Signé, L and Johnson, C. 2018. *The potential of manufacturing and industrialization in Africa Trends, opportunities, and strategies*. Africa Growth Initiative. The Brookings Institute.

⁸ Newfarmer, R., Page, J. & Tarp, F. 2018. Industries without Smokestacks and Structural Transformation in Africa: Overview. In *"Industries without Smokestack - Industrialization in Africa Reconsidered"*. UNU-Wider Studies in Development Economics. UK: Oxford University Press.

⁹ See also: Dinh, Hinh T., Palmade, V., Chandra, V. & Cossar, F. 2012. *Light Manufacturing in Africa - Targeted Policies to Enhance Private Investment and Create Jobs*. Co-publication of the Agence Française de Développement and the World Bank. <http://siteresources.worldbank.org/DEC/Resources/LightManufacturingInAfrica-FullReport.pdf>

¹⁰ Dinh, Hinh T. 2017. *Jobs, industrialization, and globalization*. Rabat: OCP Policy Center. https://www.policycenter.ma/sites/default/files/Livre%20-%20Jobs%20Industrialization_0.pdf

the increasing importance of promoting manufacturing in developing countries in its economic development strategy¹¹, and aims to develop and implement an effective and coherent portfolio of manufacturing support programmes.

The overall objective of DFID's efforts to promote industrialisation, in which stimulating manufacturing activities is the most essential element, is twofold:

- To increase the importance of the manufacturing sector within the overall economies of countries in which DFID has a presence, increasing manufacturing productivity and the share that manufacturing contributes to GDP and thus, supporting structural transformation. This equally includes raising the share of employment in the manufacturing sector and the share of manufactured products as exports, among other outcomes.
- To ensure that an expanding manufacturing sector has positive development impacts for society with regard to DFID's broader inclusive development objectives, including poverty alleviation, job creation, labour rights, gender, equality, clean production, etc.

The broader impacts of manufacturing are also greatly relevant to DFID's overall human development agenda. Manufacturing creates jobs through direct, indirect and multiplier effects. It provides better quality jobs for both blue and white collar involved in medium to high technical content. Manufacturing implies the creation and transferability of skills and capabilities that are systemic, higher value and formal (e.g. technical managerial and quality management jobs). Manufacturing is highly connected to other key sectors, opening employment in those sectors (packaging and fertilizers for agribusiness, electronics equipment for telecoms, etc.). Manufacturing has played a crucial role in job creation, by absorbing surplus labour from traditional sectors and directing it into higher-paying, formal activities.

IMC Worldwide undertook a review of DFID's global manufacturing support portfolio. The study includes an analysis of manufacturing support approaches of other donors and multilateral organisations (MOs) with a view to providing ideas and context for DFID to formulate future manufacturing support programmes. This concluding synthesis report proposes recommendations and suggests a way forward to operationalize DFID's manufacturing promotion ambitions. This report is structured in two parts. Part A reviews manufacturing facts and trends on a global scale and discussed the emerging challenges. The further explore support and investment opportunities of various manufacturing subsectors in developing countries. Part B is moves into the operational consequences of developing manufacturing programme analysis of comparative advantage, product space and binding constraints. Further programme output and input in a logical framework. The last chapter discusses organisational implications in terms of DFID's spending on manufacturing support and the internal and external coordination of manufacturing programmes.

¹¹ DFID. 2017. *Economic Development Strategy: prosperity, poverty and meeting global challenges*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/587374/DFID-Economic-Development-Strategy-2017.pdf

PART A: FACTS AND TRENDS IN MANUFACTURING

1. Global trends in manufacturing

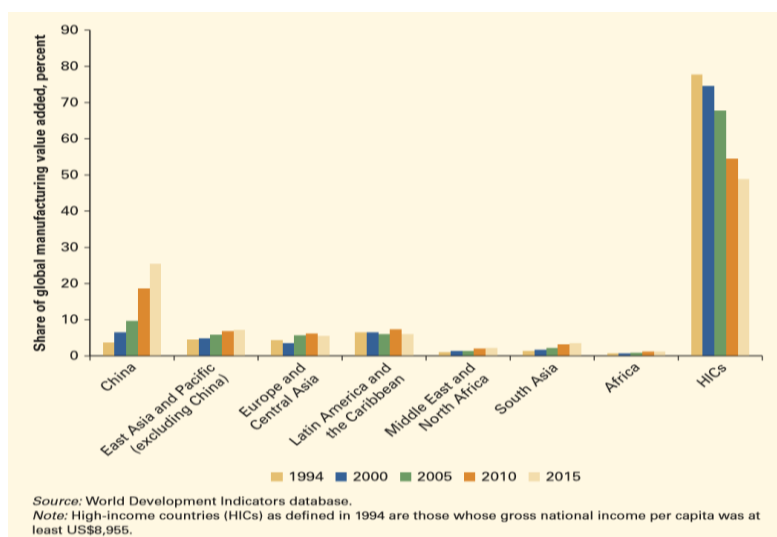
1.1 Macro-economic landscape

In the past decades, China emerged as the global factory of the world. However, the recent trend is the decline in the share of manufacturing in global GDP paralleled by a corresponding expansion in the share of services. A related recent trend is ongoing deindustrialization in almost all HICs including China.

In the last two decades, there has been a distinct shift in the distribution of global manufacturing. High-income countries' global share of manufacturing value added has been declining while that of China has expanded consistently since the 1990s. While high-income countries (HICs) still hold the largest share of Manufacturing Value Added (MVA), their share has declined consistently due mostly to offshoring of production by their multinational firms, which either established export platforms in lower-cost locations or initiated production to serve the local markets (Figure 1).

China, by far the largest winner of this trend, has emerged as the global factory of the world - its share of global MVA increased from under 5 percent in 1970 to 25 percent in 2015. The shares of a few other regions namely East Asia, South Asia and Eastern Europe in global MVA also increased but were concentrated at relatively low levels in a handful of emerging economies: India, Indonesia, the Republic of Korea, Poland, Thailand, and Turkey. China has also joined the HICs as a dominant player of manufactured exports.¹²

Figure 1: Share of global manufacturing value added in China, global regions and high-income countries, 1994 - 2015



Source: Hallward-Driemeier and Nayyar, 2017

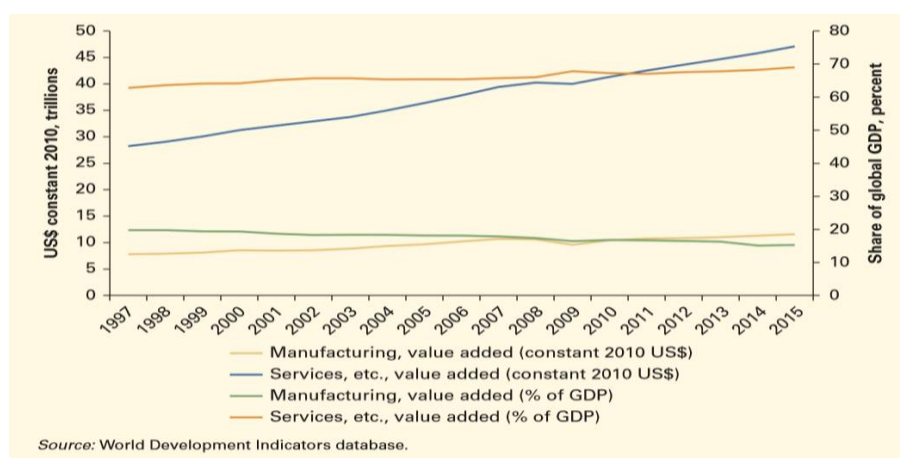
A second remarkable trend is the decline in the share of MVA in global GDP paralleled by an expansion in the corresponding share of services, which relates to the dominance of services in high income countries. From just under 20 percent in 1997, the share of MVA in global GDP shrank to

¹² Hallward-Driemeier, M., Nayyar, G. 2017. Trouble in the Making? The Future of Manufacturing-Led Development. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/27946>

under 15 percent by 2015 (Figure 2). This decrease was offset by rapid growth in the share of Services Value-Added (SAV) in global GDP, which increased from 62 to 69 percent during the same period. In real terms (constant 2010 prices), the manufacturing sector did not contract. Between 1997 and 2015, the level of global MVA rose by 49 percent from US\$7.8 trillion in 1997 to US\$11.6 trillion in 2015.

A third trend is recorded in ongoing deindustrialization in almost all HICs including China. A large part of the contraction in the share of manufacturing in their domestic economies is attributable to the faster rise in the demand for services and a growing share of service inputs in manufacturing.¹³ In upper middle-income countries, the composition of production and exports is also changing and seems to mimic the “flying geese” paradigm, i.e., moving from labour-intensive to higher-skill manufactured goods except for China, which is a dominant player in both types of goods. Outside Asia, few lower middle-income countries display a revealed comparative advantage in anything but labour-intensive goods or commodity-based regional processing. Most are far from the global technology frontier.

Figure 2: Global manufacturing share of GDP and absolute value relative to services, 1997-2015



Source: Hallward-Driemeier and Nayyar, 2017

Evidence of the peaking of manufacturing shares of both total value-added and employment at lower levels and at lower levels of per capita income than observed in the past have triggered concerns regarding “premature deindustrialization”.¹⁴ In a sample of 42 countries between 1950 and 2012, the peak shares of manufacturing in value added and employment were both lower and occurred at lower levels of development than in the past. Moreover, the process was more rapid in successive decades since the 1960s.¹⁵ While this stylized fact is generally acceptable, whether it is indeed “premature” is being debated primarily because many believe that the rapid ‘servicification’ of manufacturing or the increasing use of modern services such as computing and AI in the production of manufactured goods in recent decades have created some measurement challenges.

¹³ Ibid.

¹⁴ Dasgupta, S. & Singh, A. 2006. *Manufacturing, Services and Premature Deindustrialization in Developing Countries: A Kaldorian Analysis*. WIDER Working Paper Series 049, World Institute for Development Economic Research (UNU-WIDER).

¹⁵ Rodrik, Dani. 2016. Premature Deindustrialization. *Journal of Economic Growth* 21: 1–33.

1.2 Global Value Chains

Manufacturing in global value chains (GVCs) breaks the production process into different steps that can be carried out in different countries. This creates opportunities for developing countries to enter manufacturing by producing components of larger goods. However, after significant growth, there are signs that the role of GVCs may now be diminishing.

While manufacturing has historically played a pivotal role in industrialisation and the graduation of countries to a high-income status, in recent decades several developments are reshaping the global manufacturing landscape and calling into question its potential to serve the low- and lower middle-income countries (LMICs) effectively. Typically, LMICs which specialise in labour- and commodity-intensive manufactures have had an opportunity to reap the dynamic spill overs associated with international trade - scale, technology diffusion, and competition - with large-scale employment creation for unskilled workers. However, the recent emergence and stronghold of global value chains (GVCs) which break up the production process into different steps that can be carried out in different countries, is posing new challenges for the LMICs to expand their share of global manufacturing.

Geography is a vital determinant in a LMIC's ability to participate in a GVC of manufactured products as it facilitates trade in parts and components that is the quintessence of GVC trade. The world seems to have only three interconnected production hubs for extensive trade in parts and components - one centred on the United States, one on Asia (China, Japan, Republic of Korea), and one on Europe (especially Germany). The vast majority of the bilateral flows of parts and components occur between the countries in these hubs. Except for China, developing countries are generally on the periphery and tend to trade with the hub that is geographically closest. This is problematic as many developing regions, especially most African countries, are far from the hubs and are excluded from GVC trade. Moreover, within developing countries that do participate in a GVC, it is the large firms that tend to be involved. The lead firms in the HICs are usually the lead buyers with significant market power; they set the minimum entry bar through decisions about the technological standards and skills required to produce parts and components for assembly in the GVC. Two critical stumbling blocks for LMICs to participate in a GVC are distance from the global technological frontier and the sophistication of knowledge activities such as R&D and product design required in the early stages of production, or marketing, logistics, and after-product servicing required in later stages that are generally performed in the HICs where the mass consumption products are eventually purchased by households.

Table 1: Intra-regional trade within the three global GVC hubs reflects the low participation of LMICs in GVCs

		Intra-European trade as a share of total trade	Intra-Americas trade as a share of total trade	North to South America trade as a share of total trade	South to North America trade as a share of total trade	Intra-Asia trade as a share of total trade
Trade in Intermediate goods	Exports 1995	70%	50%	14%	40%	
	Exports 2015	70%	58%	25%	50%	66%
	Imports 1995	70%	48%			
	Imports 2015	70%	41%			
Trade in Final goods	Exports to extra-regional markets in 2015	66% (70% in 1995)	40%			60%

Source: World Bank 2017.

In the last decade, GVCs accounted for 60–67 percent of global trade in value-added terms (World Bank, 2017), raising concerns in both rich and poor countries. Rich-country electorates worry that manufacturing is being hollowed out and semiskilled production jobs have moved to developing countries or, to the extent that such jobs still remain in HICs, have suffered downward pressure on wages. Poor countries worry that they are trapped in low-value-added activities and are locked out of the higher value-added activities in design, key technological inputs, and marketing.

Trade in intermediate goods contributed more than trade in final goods to the growth of total manufacturing trade in 2001–08 and 2009–14 and to its decline in 2000–01 and 2008–09 (World Bank 2017). Trade in final goods contributed more to the growth of manufacturing trade during 1995–2000 and to its recent decline in 2014–15. The weight of intraregional exports in trade in intermediate and final manufactured goods over 1995–2015 for Europe, the Americas, Asia, and the rest of the world highlights the large shares of intraregional linkages among them and confirms that GVCs are organised mainly at the regional level.¹⁶ Table 1 shows that European industrial inputs originate essentially from European supply chains. While the shares are not as high, the share of intra-American trade in total intermediate goods trade gradually increased sharply between 1995 and 2015. While the shares of manufacturing inputs in trade within both North and South America are relatively low, those between North America and South America are higher. The two-way intra-Asia trade in intermediate goods was almost as high as Europe.

Historically, LMICs have tended to export unprocessed raw materials but GVCs offer an opportunity to trade in manufactures and diversify their exports in variety and value-addition. GVC might also provide benefits to developing countries by enabling them to produce components in larger manufactured goods. However, a challenge for LMIC policymakers is to find productive ways to facilitate the entry of LMICs in GVCs, if they want jobs and productivity increases. A serious present limitation is the low technology and skills in the lowest income countries, which hampers the integration in high-value product or component GVCs on the short run.¹⁷

A recent report of the economist (July 2019) finds that the GVCs in 16 of 17 big industries it studied have been contracting since the global financial crisis. Exports in those same value chains declined from 28.1% to 22.5% of gross output between 2007 and 2017.¹⁸ The importance of GVCs in production seems to be stalling. The biggest declines in trade intensity were observed in the most heavily traded and complex GVCs, such as those in clothing, cars and electronics.

A closer look into these recent trends in GVCs and globalisation shows patterns of regionalisation suggesting that more production is happening in markets that are closer to major consumers¹⁹. MNCs are reducing reliance on GVCs due to a reappraisal of risk (including political) and the growing importance of services within manufacturing (which, for example, encourages reshoring to be more attuned to local consumer needs). Transnational corporations are clearly rethinking the linear sourcing model for Western markets, but the path forward is unclear. Different industries in different manufacturing sub-sectors will make different choices.

¹⁶ World Bank 2017, Baldwin and Lopez, 2013

¹⁷ Suggested by EGAT in commentary on the earlier version of the working document.

¹⁸ The Economist, 2019. Supply chains for different industries are fragmenting in different ways. July 11th issue 2019.

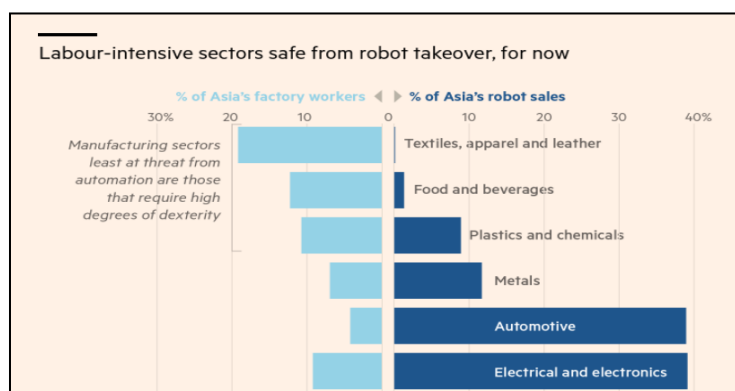
¹⁹ Ibid.

1.3 Emerging challenges – Industry 4.0

Automation is happening. There is uncertainty over the precise impact and timing. However, the most important manufacturing sub-sectors located in developing countries are unlikely to be adversely affected in the short term.

Another salient development in modern manufacturing is Industry 4.0 or the profusion of modern process technologies associated with the new production paradigm powered by robotics, AI, the Internet of Things, and 3-D printing. Industry 4.0 seems to be disrupting traditional manufacturing patterns by pushing manufacturing in the HICs closer to labour-saving technologies which seem unlikely to help the LMICs in expanding their share in global manufacturing. An ongoing debate is centred on the feasibility of manufacturing-led development in LMICs that have a competitive advantage in cheap labour and still use traditional manufacturing technologies and compete on price.

The speculation is that production processes based on Industry 4.0 in high-income countries will be able to deliver higher and better quality at lower unit prices, eliminating manufacturing jobs in the LMICs. Recent evidence however suggests that these concerns are exaggerated, especially in LMICs.



Although some studies estimate that half or more of current occupations across all sectors could be automated away by new technologies other studies show that only 6 – 12 percent of current jobs are at high risk of automation in the OECD.²⁰ Others find that the threat of automation to jobs is relatively modest, at 2–8 percent for LMICs.²¹

The manufacturing sector is increasingly relying on services, whether as inputs, as activities within firms or as output sold bundled with goods. This “servicification” fundamentally changes the nature of the manufacturing sector.²² Most of the service inputs require technically skilled and tech savvy workers which are in short supply. Evidently, from 1995 to 2011 the share of service inputs in the total production value of manufactures increased by about 6 percentage points, on average, across countries. For the median economy in the sample, the contribution of services to gross manufacturing output was about one-third of manufacturing gross output in 2011 but the range was wide stretching from about 15 percent in Indonesia to 50 percent in France and 70 percent in Luxembourg. To the extent that this increase in the services component of manufacturing reflects consumers’ preference for more service-intensive inputs such as sophisticated design, computing and software, or assembling production inputs that are increasingly diffused geographically and therefore require world-class logistics and communications skills, the paucity of skills in the LMICs will be a disadvantage (IMF, WEO April 2018).

²⁰ Bowles 2014; Frey and Osborne 2013; Manyika 2016; World Bank 2016), Arntz, Gregory, and Zierahn, 2016)

²¹ Ahmed and Chen 2017.

²² Hallward-Driemeier, M., Nayyar, G. 2017. Trouble in the Making? The Future of Manufacturing-Led Development. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/27946>

Both in the academic world and among development practitioners there is much debate about the role of manufacturing and the future prospects for low- and middle-income countries (LMICs) in Asia and Africa. Trends are flagged such as premature de-industrialisation in Africa and the implications of Industry 4.0 and labour-saving technologies on manufacturing.²³ These trends seem likely to hinder LMICs in expanding their manufacturing base as well as their share of global manufacturing production. Consequently, it is not expected that the manufacturing sector will offer as much labour-intensive work in the long run as it previously did in advanced economies.

While it is true that the emergence of phenomena such as servicification and Industry 4.0 are a challenge for LMICs in becoming or remaining competitive locations for manufacturing, there are at least two stylised facts that suggest job creation by industrialisation on the short run. First, in the medium to longer term, changes at the intersection of technology and globalisation will remain the most relevant forces shaping the geography of manufacturing production. To compete, LMICs will need a workforce with a large share of high- and medium-skill, tech savvy workers who are adept at keeping up with global technological know-how and have the flexibility to adapt and innovate. While few LMICs are presently well positioned to take on this challenge, Chinese policymakers have demonstrated that among other things, these parameters can be changed with appropriate and timely reforms and investments in human capital and technology.

Secondly, closing the gap with the global labour productivity frontier is easier in manufacturing than other sectors of a LMIC and can be strategic in transitioning to a high-income status. In a sample of 130 economies, Rodrik (2013, 2016) provides solid evidence to demonstrate that labour productivity in manufacturing has tended to converge to the frontier, regardless of policies, institutions, and other country characteristics (unconditional convergence), whereas labour productivity for the overall economy (and hence the nonmanufacturing sector) has not. This unique attribute implies that a growing manufacturing sector can play a fundamental role in the catch-up of the LMICs with the advanced economy per capita income levels. McMillan and Rodrik (2011) provide further validation by showing that structural transformation between 1990 and 2005 tended to be growth-reducing in developing countries that did not experience increases in the share of manufacturing employment.

In conclusion, most of the challenges are more relevant for upper middle-income countries and not for low income and lower middle-income countries. The most important manufacturing sub-sectors located in those countries are unlikely to be adversely affected in the short term. In any case, a successful African economy of the twenty-first century is unlikely to look like the successful East Asian economy of the twentieth. It will be more diverse and draw on a broader range of highly productive economic activities for sustained growth.

²³ Rodrik, Dani. 2016. "Premature Deindustrialization." *Journal of Economic Growth* 21: 1–33.

2. Manufacturing subsectors in developing countries

Different subsectors require different factor/input intensities, output markets, infrastructure requirements and have short and long development prospects. Focusing on priority manufacturing subsectors in support programmes is an effective approach applied by leading donors and MOs. Below is an overview of trends in some key manufacturing sub-sectors of particular significance to developing countries and a summary of their requirements and impacts on a host country.

Although the manufacturing sector is often discussed as one sector in theory and policy and programme practice, in reality the sector is a heterogeneous collection of subsectors with differences in terms of products, technology and requirements as well as growth opportunities and societal impacts.²⁴ This chapter explores key selected manufacturing subsectors in developing countries and reviews the different features in terms of inputs (capital, labour, local natural resources, technology/R&D), markets (domestic, export) and economic value creation and longer term societal (development) impact and investment attractiveness.

2.1 Selected manufacturing subsectors

Textiles and garment

Since the mid-1980s, textile and garment global value chains (buyer-driven) managed by branded manufacturers from the advanced countries have channelled exports mainly from developing economies to markets in the EU, the U.S. and Japan. It is a sector where relatively modern technology can be adopted even in poor countries at relatively low investment costs. These technological features of the industry have made it suitable as the first rank on the industrialisation ladder in poor countries, some of which have experienced a very high output growth rate in the sector (e.g. Bangladesh, Sri Lanka, Viet Nam and Mauritius).²⁵

The garments subsector has been a low-tech, unskilled labour-intensive activity, surviving on cheap predominantly female labour. There have been significant human rights issues in the garment industry (the collapse of the Rana Plaza in 2013 was a turning point toward more seriously observing labour conditions in the subsector). The industry is undergoing a technological renaissance and the more competitive firms will be those that harness new design production and IT technologies and match these with a more skilled workforce. The leading top tier firms are already moving in this direction but for the rest, a change is required in hiring, compensation and in-house training practices.²⁶

Textile and garment imports from China and Indonesia have been declining due to the rising cost of labour. Many African countries are striving to move up the global value chain in the footsteps of countries like China and (more recently) Bangladesh. Several African countries, like Uganda and Tanzania, have an inherent advantage because they are major cotton suppliers.²⁷ The global value chains are also changing because of the ending of the several trade agreements (Multi Fibre

²⁴ Boomgard, J., Davies, S., Haggblade, S. & Mead, D. 1992. A subsector approach to small enterprise promotion and research. *World Development* 20(2): 199-212.

²⁵ Quarcoo, R., Modesta, E., Gavor, D. & Tetteh-Coffie. 2012. Challenges Facing Garment Producing Industries under AGOA in Ghana. *International Journal of Clothing Science*. 2(1): 9-14. doi:10.5923/j.clothing.20130201.02

²⁶ Yusuf, S. 2012. *Garment Suppliers Beware - The global garments value chain is changing*. Working paper International Growth Centre S-37044-PAK-1. <https://www.theigc.org/wp-content/uploads/2012/12/Yusuf-2012-Working-Paper.pdf>

²⁷ <https://blogs.worldbank.org/jobs/moving-garments-global-value-chain>

Agreement), slowing growth in the advanced countries, rising South-South trade, shifts in consumer demand and technological advances on several fronts.

Automation in some instances transforms the workshops in Bangladesh and brings production back to western countries. Technology is becoming more advanced and machines can increasingly handle difficult tasks such as manipulating pliable fabrics, stitching pockets and attaching belt loops to pants. A 2016 ILO study predicted some Asian nations could lose more than 80% of their garment, textile and apparel manufacturing jobs as automation spreads. As such, the number of new jobs added by the garment and textile trades has fallen to 60,000 a year, from over 300,000 annually between 2003 and 2010, according to World Bank data.²⁸

Case 1: Textile and garment company – Kikoy beach towels in Kenya²⁹

The Kikoy beach towel company in Nairobi was established in 2010 by a Kenyan entrepreneur who saw attractive business opportunities in the subsector. He started his business without sewing machines employing 10 people. The owner received information about a newly constructed ‘Export Processing Zone (EPZ)’ in Nairobi and moved to the site in 2012. At the EPZ, the company grew rapidly and specialised in producing their main product: Kikoy beach towels. At present, the company has 26 sewing machines employing 70 skilled people. The company exports to Europe (Denmark, Germany, Italy, Spain, France, The Netherlands and the UK) and to Japan.

The EPZ provides tax incentives (no corporate tax for 10 years, export and VAT tax holidays amongst others) and provides infrastructure and facilitation in export procedures, logistics and acquisitions. The owner feels that the EPZ is a good location, much more efficient in regard to export procedures and paperwork. Before the company entered the EPZ, they had to take their products to the airport, and complete the documentation and procedures by themselves. It usually took a week before the products could actually be shipped. Now, thanks to the efficient customs office at the EPZ, if the product is finished by 3 pm, then by 6 pm it is at the airport with the procedures completed and ready to go.



The owner makes serious efforts to retain his trained staff in times of less orders, because getting skilled labourers back is a problem. Hiring new staff and training them to stitch the expected quality takes 2 to 3 months. The owner does not want to lose staff because they have unique skills – “it’s not everyone who can do this”.

Food and beverages

The food system contributes a significant share of jobs in developing countries. Apart from just primary agricultural production, the sector includes food storage, manufacturing and processing, distribution, transport, associated logistics, retailing and other services. In many countries, the off-farm aspect of the food system accounts for a large share of the economy’s manufacturing and services sectors. In Malawi and Tanzania, for example, food and beverages account for more than 40 percent of total manufacturing employment.³⁰ While the employment share in farming tends to decline as per capita incomes rise, the share in food manufacturing and services increases. In low-income countries, farming tends to dominate employment in the food system. As countries grow, manufacturing accounts for a much larger share of job creations, to 25% in Brazil for instance.³¹

²⁸ <https://www.wsj.com/articles/the-robot-or-poor-countries-1518797631?tesla=y&mod=e2fb>

²⁹ Voeten, J., Kinyanjui, B., & Barasa, L. 2015. *Kenya: Qualitative study on Innovation in Manufacturing Small and Medium Sized Enterprises (SMEs): Exploration of Policy and Research Issues*. DFID research project “Enabling Innovation and Productivity Growth in Low Income Countries (EIP-LIC)”²⁹, Tilburg: Tilburg University

³⁰ World Bank. 2017. *Future of Food - Shaping the Food System to Deliver Jobs*. Washington: The World Bank

³¹ Ibid.

Food and beverages processing are a significant driver of local economies, creating supplier linkages for small-scale farmers and helping elevate rural incomes across Africa and Asia. However, small and growing local processors often have difficulties producing high-quality affordable and nutritious products that meet food safety standards and regulatory requirements due to a lack of technical and business knowledge and investment. Moreover, the industry requires high capital investment and quality inputs from the value chain, which are sometimes difficult to obtain.

Case 2: Soya beverages and cakes company in Uganda³²

The owner of the soya beverage company in Kampala started producing and selling food with simple traditional oven. His business, informal at first, grew slowly then experimented with new products. Today established as a formal business with 40 employees, the company produces several key products including Soya Cup, a drinking product that tastes like coffee. The owner realised that soya is by far the most nutritious product available in Uganda. Moreover, Uganda is one of the top 4 major soya producers in Africa. Unfortunately, the supply of locally produced soya is not always reliable in terms of quality and volume. The owner is not happy with the fact that 50% raw beans are exported from Uganda – “we are not only exporting beans cheaply but also exporting jobs.”

The company targets the Ugandan domestic market, selling directly to supermarkets, retailers, some schools, a few NGOs, and also individual customers via a small company shop. In terms of marketing, the products are advertised on radio and TV. He sees the necessity for Uganda to add value to the country and export finished products – “the industrialisation of this country is the way to go for us to get real value from our agricultural production.” The owner mentions that his focus on and persistence in business is a key success factor. Although his formal education is limited to primary school level, he has trained himself by attending short courses networking with food experts.



The owner feels the business environment is politically acceptable, although the government lacks the means and capacity to provide direct support to his business. He borrowed from money lenders – “these guys used to charge 20% per month.” He feels the high taxes are unacceptable – “the taxes are killers.” The Ugandan Small-Scale Industries Association offered him several useful business development services, including courses on how to bring products to market, marketing and financial management.

The growth of the food and beverages industry is propelled mainly by developing countries such as India, China, and Brazil, as the economies of these nations improve and more people are lifted into the middle class.³³ In Africa and Asia, the food and beverages sector increased faster than the average of other manufacturing sub-sectors, partly because of the importance of growing domestic demand.³⁴ Urbanisation and population growth are expected to aid this consumer spend. As disposable income rises, consumer expenditure on food and beverages in Africa and Asia will increase from 53% of global expenditure in 2017 to 60% by 2030.³⁵ Reflecting Africa’s growing population and rising household incomes, manufacturing of regional processing goods such as food and beverages is a second major opportunity according to McKinsey Global Institute.³⁶

³² Voeten, J. & Bagire, V. 2017. Uganda: Qualitative study on Innovation in Manufacturing Small and Medium Sized Enterprises (SMEs): Exploration of Policy and Research Issues. DFID research project “Enabling Innovation and Productivity Growth in Low Income Countries (EIP-LIC), Tilburg: Tilburg University.

³³ <http://www.careerizma.com/industries/food-and-beverage/>

³⁴ ODI Blog Dirk Willem te Velde. 2016. Why African manufacturing is doing better than you think.

<https://www.odi.org/blogs/10382-why-african-manufacturing-doing-better-you-think>

³⁵ <http://foodstuff-africa.com/food-and-beverage-industry-set-to-grow-worldwide/>

³⁶ McKinsey Global Institute. 2016. Lions on the Move II: Realizing the potential of Africa’s economies.

<https://www.mckinsey.com/featured-insights/middle-east-and-africa/lions-on-the-move-realizing-the-potential-of-africas-economies>

Still, Africa imports about a third of its processed food and drink, a far higher share than developing Asia or Latin America. Thus, the scope for food and beverages import substitution is clear; much more of that could be made locally.³⁷ At the same time, the Africa-EU - international trade statistics suggest that there are export opportunities beyond the regions as well. Between 2007 and 2017 the share of food and beverages exports from Africa to the EU rose substantially from 10% to around 15%³⁸.

The observed food production and consumption trends highlight the importance of pursuing a substantial transformation of the food system in Sub Sahara Africa and Asia if incomes are to be risen and food security problems are to be mitigated. Agriculture and related manufacturing are marked by low productivity with little application of science and technology. Improvements in productivity require innovations in technology and adoption and application of these technologies.³⁹

Pharmaceuticals

The McKinsey Global Institute⁴⁰ suggests that there is a substantial opportunity for pharmaceutical companies in local production, especially in sub-Saharan Africa, through public, private and mixed partnerships, or regional initiatives for licensing of production in an effort to improve access to affordable medicines. Local production can reduce the dependency on global donations and the shrinking number of foreign companies who dominate the global market.

Proponents of local production, including activist organisations such as Médecins Sans Frontières and organisations within the United Nations (UN), argue that local production of pharmaceuticals would decrease transport costs, provide local jobs, improve local expertise, and cut dependence on foreign suppliers. Many leaders in developing countries in Africa and Asia appear to believe it will also help their nations in achieving economic autonomy and sustainable development. The African Union has previously highlighted the need to “formulate a plan of action to facilitate increased drug manufacturing in the region and to bolster research and development (R&D).”⁴¹

However, in some instances today, local manufacturers in developing countries have shown insufficient regard for industry-standard best-practices. With little or no local regulatory control, substandard drugs are manufactured and distributed widely. Such low-quality drugs pose an immediate threat to public health and a potentially more serious challenge to the long-term viability of many first-line drugs by encouraging drug-resistant strains of pathogens. Most manufacturers in developing countries operate without much regard for international standards and experts stress the need for regulatory standards.⁴²

Since 2006, UNIDO has provided technical cooperation and advisory services to advance local pharmaceutical production in developing countries with a wide range of public and private sector partners. Under a global project, UNIDO contributed to improving the operational environment and technical capacities of local manufacturers and helped in “mainstreaming” local pharmaceutical production as a global development theme. In May 2018, UNIDO and the West African Health

³⁷ The Economist. 2016. In or out? Should Africa concentrate on serving local or global markets? Sep 17th 2016.

³⁸ https://ec.europa.eu/eurostat/statistics-explained/index.php/Africa-EU_-_international_trade_in_goods_statistics

³⁹ Nicolas Depetris Chauvin, N. D., Mulangu, F. and Porto, G. 2012. *Food Production and Consumption Trends in Sub-Saharan Africa: Prospects for the Transformation of the Agricultural Sector*. United Nations Development Programme (UNDP), Regional Bureau for Africa WP 2012-011

⁴⁰ McKinsey Global Institute. 2016. Lions on the move ii: realizing the potential of Africa’s economies. <https://www.mckinsey.com/featured-insights/middle-east-and-africa/lions-on-the-move-realizing-the-potential-of-africas-economies>

⁴¹ Bate, R. 2008. Local Pharmaceutical Production in Developing Countries - How economic protectionism undermines access to quality medicines. Campaign for Fighting Diseases discussion paper no. 1

⁴² <https://www.unido.org/our-focus-advancing-economic-competitiveness-investing-technology-and-innovation-competitiveness-business-environment-and-upgrading/pharmaceutical-production-developing-countries>

Organization (WAHO) agreed to collaborate and support the development of the pharmaceutical industry across the ECOWAS region.

Leather and footwear

The global leather value chain is a complex system of animal husbandry, industrial and assembly processes and branded marketing, with semi-finished and finished products being sold and exported between companies and countries. One peculiarity of this value chain is its dependence on another value chain, animal production. Essentially, the leather industry is built on meat production worldwide. Human skills, equipment and chemicals are needed for the production of top quality leather.

For footwear and leather garments and goods sectors, additional attributes are required like high manufacturing skills, design know-how, computer-aided design systems, branding and marketing. Environmental policy with respect to process standards, economic and eco-labelling schemes have received more attention in the recent past and although these measures are intended to protect the environment, support trade and reduce unfair competition, they might at first increase the scale of the burden in many developing countries due to the lack of financial and managerial skills that are required for successful implementation and monitoring of these standards. Trade barriers still exist in both EU and the US. Growth and upgrading are real possibilities for firms in the global leather value chain. China's development to the leading footwear supplier to the United States and the EU in 25 years is an example of this. This paper provides policy recommendations for developing and less developed countries, and for international organisations.⁴³

The current predictions are that the supply of leather raw material will continue to grow in line with population growth, but trends that indicate higher costs of production and a decreasing availability of land for raising cattle and for growing grains to feed the cattle, as well as an increase in pork and poultry consumption in Asia and Africa, are now becoming apparent.⁴⁴ Leather raw materials have increasingly become available in the developing world, while in the developed countries, a declining per capita consumption of red meat has reduced the supply of hides and skins. Now, more than half of the world's supply of leather raw material comes from the developing world and, increasingly, those countries with large supplies are seeking to add value through processing them through to finished leather goods.

Historically, the tanning industry was characterised by small or medium-size family businesses. The trend has been for the manufacture of leather products to move to where labour is cheapest, and for tanneries to follow. Very often, the countries with the fastest growing leather industries – such as the Republic of Korea, Taiwan, China, Indonesia and Viet Nam – have been hindered by shortcomings in raw material supply and had to import large quantities of hides and skins. Now, new tanneries are being set up in these countries in order to meet the growing demand for leather, while most tanners in Europe, Japan and the USA have closed down their facilities. This trend seems likely to continue.

China has been, by far, the most significant player in all sectors of the leather industry in recent years. The country now dominates every category of manufacturing by a considerable margin. Lately, China has recognised that it has allowed development of this industry without proper environmental safeguards, and it is now starting to take corrective action. It has also reduced its support for footwear manufacturing since it is substituting production for higher value products. This does not mean that China's dominance of the industry will end. It is expected that the Chinese industry will continue to

⁴³ Memedovic, O. & Mattila, H. 2008. The global leather value chain: the industries, the main actors and prospects for upgrading in LDCs. *Int. J. Technological Learning, Innovation and Development*, 1(4): 482–519.

⁴⁴ Leather By India Blogspot. 2015 Future Trends in the World Leather, Leather Products Industry and Trade-series-post 3 http://jewelryendlocks.blogspot.com/2015_06_01_archive.html

grow, but at a slower pace and in a different way. More of its output of leather products, in particular footwear, will be used to meet domestic demand rather than to export. In addition to these changes, increased costs in China- particularly in the rising wage rates, have already created new opportunities for further development of the industry in Viet Nam, Indonesia, Bangladesh, and India. No country has the size or capability to replace China as industry leader, but these shifts have given a boost to many other aspiring nations.⁴⁵

Case 3: Leather processing – leather bags and handicrafts in Ethiopia⁴⁶

The leather products company is located in Addis Ababa and produces a range of bags, cases, tourist items, corporate gifts and other handicrafts. The products are mostly shipped to the US, Germany and China, with only a small proportion sold in Ethiopia. The company has 18 permanent workers and often many more temporary staff, up to 100 depending on the volume of orders. The designer/production manager designs leather backpacks and laptop bags himself – “You can do a lot of design with leather.” The company has stitching machines from Germany and China, the latter requiring “maintenance every day.” The company has a spacious workshop, which they acquired five years ago through a government programme, launched in 2010, to support small businesses by providing land on long-term leases.

The business environment has not been easy but has provided many opportunities. The company faces increasing competition – “The competitors buy design items here and copy them.” The input material is bought in Ethiopia, mostly leather from young goats. The goat meat is exported abroad but the leather remains in Ethiopia for leather product manufacturing, and other uses. The designer invests a lot of time in searching for the best leather. The quality improves if chemicals are used, but at the moment, the dollar rate is high, so fewer imported chemicals are available – “Then the companies stop using chemicals and the quality drops.”



The company imports the accessories directly, which is problematic due to limited access to foreign currency. Moreover, the government regulates imports and tells companies where to buy their input materials. For instance, the company has to buy zippers from China, “which is based on a political agenda, but the quality is not good.” The production volume, turnover and profit are still growing every year – “The past year was good, this year is even better. Every year it is about 5% more.” The designer/production manager thinks this is because of good product quality.

Automotive

The dream of a viable, full-blown national automotive industry lies beyond the reach of all but the very largest developing countries, and even in these countries it seems inevitable that multinational firms will continue to dominate the domestic industry for a long time to come.⁴⁷

But there are several other avenues open for development. A few midsize developing countries, such as South Africa, Thailand, and Turkey, are large and rich enough to support vehicle assembly for their domestic markets as long as they can export to their wider regions as well. Several developing countries are close enough to developed countries to supply parts on a just-in-time basis within regional trade blocs. These countries have become export hubs for labour-intensive parts and more recently for low-cost vehicles as well. A nascent possibility is for local automakers to leverage the

⁴⁵ UNIDO. 2010. *Future trends in the world leather and leather products industry and trade*. Vienna: United Nations Industrial Development Organization

⁴⁶ Voeten, J. & Gizaw, B. 2018. Ethiopia: Qualitative study on Innovation in Manufacturing Small and Medium Sized Enterprises (SMEs): Exploration of Policy and Research Issues. DFID research project “Enabling Innovation and Productivity Growth in Low Income Countries (EIP-LIC), Tilburg: Tilburg University.

⁴⁷ Sturgeon, T. and Van Biesebroeck, J. 2010. *Effects of the Crisis on the Automotive Industry in Developing Countries: A Global Value Chain Perspective*. Policy Research Working Paper 5330, World Bank, Washington, DC.

new, relatively open global supply base to rapidly become more competitive locally and, perhaps, in world markets.

As the markets for motor vehicles shift to the developing world and production inevitably follows, more development and design work will shift as well. In India domestic firms have deeper engineering capabilities, and the small, bare-bones vehicles that dominate the local market comprise a segment that has eluded most multinational firms so far. It remains to be seen whether these vehicles can be successfully exported. The prospects for local companies in automotive global value chains are still less promising than in other industries, but the future could eventually become significantly bright.

At the same time, the Economist (July 2019) signals a recent trend towards greater regionalisation and suggests more automobile production will occur in proximity to major consumer markets. The car industry seems to concentrate and merge around three regional hub-and-spoke networks: Mexico as the low-cost spoke for America; Eastern Europe and Morocco for Western Europe; and South-East Asia and China for Asia.⁴⁸

Case 4: Automotive – truck chassis in South Africa⁴⁹

The truck manufacturing company is located in Pretoria and assembles tailor-made trucks from the frame, engine and chassis parts, supplied by the original equipment manufacturers. The company specialises in tipper, dropside and flat deck truck bodies as well as water and vacuum/sewage tankers. The company employs 55 people at present.

The company was established 19 years ago by a South African involved in the truck body building business. The company does not do a lot of advertisement and it has never had a sales representative or marketing manager – “we have been very lucky so far that we get sufficient requests for quotes followed by actual orders.” Recently, the company has received orders from different dealers in neighbouring countries. In fact, the company just started to export in the region – “export is very small at this stage, but there is so much potential for our company.”

The company engages low-skilled workers with basic skills – “as long as they have some expertise and experience and they are willing to learn, then we take them on board.” Higher qualified and experienced staff expect a certain salary and “unfortunately as a company and in our industry, we cannot afford those salaries.” At the same time, the owner sees a lot of business opportunities for his company on the African continent. The manager is not positive about the institutional context. He believes that South Africa is one of the most highly regulated countries in the world for running specifically in regards filling out forms, Black Economic Empowerment regulations and labour unions.



The manager sees that labour unions have gained a power base in South Africa in the past 20 years. The manager expects strikes within the company in the near future – “if you have a business in South Africa and most of your work force is part of a union, then you can expect a strike at least every second year.” The strikes mostly concern salary, safety issues and working conditions. Moreover, the manager sees that South Africa has entered a stage where business is fuelling corruption “because to get something done you need to pay somebody. It’s becoming a culture.”

⁴⁸ The Economist. 2019. Supply chains for different industries are fragmenting in different ways. July 11th issue 2019.

⁴⁹ Voeten, J. & Marais, J. 2017. South Africa: Qualitative study on Innovation in Manufacturing Small and Medium Sized Enterprises (SMEs): Exploration of Policy and Research Issues. DFID research project “Enabling Innovation and Productivity Growth in Low Income Countries (EIP-LIC), Tilburg: Tilburg University.

2.2 Development features of selected manufacturing subsectors

The manufacturing subsectors described above, and others, present development opportunities to various degrees while implying several contextual requirements. Table 2 summarises the main features (‘stylized facts’) in this respect⁵⁰ and compares development prospects and support implications for manufacturing subsectors in developing countries. The table could serve as an initial reference point to reflect on subsectors to target in a given country and assess to what extent a subsector matches the local opportunity.

Specifically, the table assesses in column 1 - 4 the intensity of the production factors (input) of each sector in terms of capital, labour, technology and to what extent local natural resources are available and could be used for production. In column 5 - 6 the need for well-developed local transport and energy infrastructure is presented. Columns 7 – 8 list the target market of the subsector, either domestic or export via global value chains. Lastly, the table assesses the immediate economic value that is created, which refers to either an increase in quantitative terms of GDP and/or employment in the subsector.

⁵⁰ The summary analysis is based on the team’s literature review of key manufacturing subsectors.

Table 2: Key sectors and inputs, infrastructure, end market, short and value creation

Features: Subsectors:	The use of production factors (inputs)				Need of infrastructure		End market (output)		9. Economic value creation
	1. Capital intensity	2. Labour intensity	3. Tech and R&D intensity	4. Local/natural resources	5. Energy	6. Transp. logistics	7. Domestic Market	8. Export/global value chains	
Textiles/garment ⁵¹	+	++	+	+	+	+	-	++	++
Food and beverages	+	++	+	++	+	+	++	+	++
Pharmaceuticals	+	+	++	+	+	+	++	-	++
Automotive ⁵²	++	+	++	-	++	++	++	-	++
Wood and furniture	-	++	-	++	+	++	+	+	+
Paper and pulp	+	-	+	+	++	++	++	+	-
Leather/footwear	+	++	+	++	+	+	+	++	+
Basic metal and metal products	+	-	+	+	++	++	++	+	+
Chemicals	++	-	+	+	++	++	++	-	++
Machinery and equipment	++	+	+	-	++	++	++	-	+
Printing/publishing	+	-	-	-	+	-	+	-	-
Petroleum refining	++	-	++	++	++	++	+	++	+
Construction / cement	++	-	+	++	++	++	++	-	++
Electronics and precision equip. ⁵³	+	++	++	-	-	+	++	+	+

Legend: ++ : High intensity/significance + : Medium intensity/significance - : No or very little intensity/significance

⁵¹ It is worth noting that establishing a textiles producing firm typically involves a capital expenditure of \$100m to 300m, while a garment (cut and trim) firm involves a capex of \$15m to 20m. Textiles are sticky attractive investments that require high R&D. Garments on the other hand have a high logistics needs for speed to markets.

⁵² There is a difference in Completely knocked Down (CKD) assembly (low capital investment, low value added, complex logistics arrangements from original manufacturer of full end products involving high capital investments). This applies for 'Machinery and equipment' as well.

⁵³ McKinsey (2016) estimates that there are limited opportunities for manufacturing global technologies in developing countries (computers and office machinery; electronics, medical precision and optical equipment).

2.3 Investment opportunities in manufacturing subsectors

For several subsectors, manufacturing is relatively capital-intensive and through FDI can generate some particular benefits in terms of job quality and technology spill overs. Industrial development banks (IDBs) can play a central role by promoting technological change. Different types of investment are attracted to countries with different characteristics and will have different impacts on the host country - these differences are summarised below. Market-seeking investments might generate local employment, but less international trade, whereas efficiency-seeking investments might lead to both more employment and more international trade.

Upgrading the industrial structure in a given country requires the upgrading of the factor endowment structure from one that is relatively abundant in labour and natural resources to one that is relatively abundant in capital, the introduction of new technologies, and the corresponding improvement in infrastructure to facilitate economic operations.⁵⁴ Manufacturing is thus a capital-intensive sector.⁵⁵ The WB states that both domestic investment and foreign direct investment (FDI), can be strong complements.⁵⁶ It is not a question whether to give priority to domestic or foreign investment for manufacturing promotion, rather to figure out what can be done make the two forms of investment work together.

There are some particular benefits of FDI that should be mentioned, however. Domestic investments create jobs in a host economy – usually many more than FDI.⁵⁷ Although foreign firms might not create as many jobs as the domestic private sector, but they often create better-paid jobs that require higher skills, which helps elevate the skills level in host economies. More advanced technologies and managerial or marketing practices can be introduced in a developing economy through FDI, and at a much faster rate than would be the case if only domestic investment were allowed. Moreover, through partnerships with foreign investors who have existing distribution channels and commercial arrangements around the world, developing countries' firms can benefit from increased market access.

In sum, FDI can help a developing country acquire an industrial base and achieve export competitiveness much faster than the “infant industry” policies with which many countries have experimented (e.g., import substitution, forced joint ventures, etc.). FDI can accelerate the “catching up” process of a developing economy and facilitate its integration within RVCs and GVCs.⁵⁸ In sum, FDI remains a core ingredient for development of manufacturing in African and Asian LMICs. In 2017, the United Nations Conference on Trade and Development (UNCTAD) reported that FDI flows to developing economies remained stable at \$671 billion, seeing no recovery following a 10% drop in 2016. However, FDI flows to Africa continued to slide, reaching \$42 billion, down 21% from 2016. Flows to developing countries in Asia remained stable, at \$476 billion. Against this background, there is an opportunity to promote FDI.⁵⁹

Capital accumulation programmes are typically (trust) funds, credit programmes, matching grants and guarantees, linked with other donors and multilateral organisations such as the World Bank. Support programmes could include various types of financial support components:

⁵⁴ EGAT/DFID policy note in Zimbabwe. 2018. Zimbabwe: Possibilities for Manufactured Exports.

⁵⁵ Adam Szirmai, A. (2009) Is Manufacturing Still the Main Engine of Growth in Developing Countries? WIDER Angle newsletter, May 2009 ISSN 1238-9544

⁵⁶ <https://blogs.worldbank.org/psd/false-debate-choosing-between-promoting-fdi-and-domestic-investment>

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ UNCTAD. 2018. World Investment Report 2018. United Nations Conference on Trade and Development.

- Direct investment (venture capital) in manufacturing enterprises. This could be realised by establishing special funds for manufacturing development (e.g. a challenge fund, trust fund, competitiveness facility, etc.), stimulating and facilitating domestic investors, and attracting FDI.
- Financial deepening to increase the provision of financial services by the finance industry, which encompasses a broad range of businesses that manage money. Such businesses include credit unions, banks, credit card companies, insurance companies, accountancy companies, consumer-finance companies, stock brokerages and investment funds.
- Patient capital investment in infrastructure by private investors such as pension funds.

Many governments adopted manufacturing promotion strategies in which industrial development banks (IDB) play a central role in promoting the process of industrial development. IDBs are specialized Development Banks (DBs) operating in multiple economic sectors and market niches (e.g., agriculture, infrastructure, international trade, housing, tourism, energy), and their ability to reach customers in sectors that private financial institutions do not serve sufficiently makes them a relevant actor in the global development agenda.⁶⁰ The world's largest development banks include China Development Bank, Brazil Development Bank (BNDES), and Kreditanstalt fuer Wiederaufbau (KfW) in Germany. The CDC Group is the largest UK development bank and is also partly funded by DFID. In terms of assets, they are larger than the World Bank. But they are not the only ones, a recent World Bank survey included information on some 90 development banks in countries around the world.⁶¹ In annex B a case of the development bank in Ethiopia is presented.

More specifically, IDBs are the financial arms of the state, channelling domestic savings towards medium- and long-term industrial projects. IDBs typically influence and promote technological change and assist in building a base for new modern technologies. By facilitating access to capital, they foster structural change. A UNIDO study (2015) reveals that industrial development banks fill a gap in the domestic financial market in which they operate by providing patient capital for long-term industrial projects and favourable conditions that make investments more attractive.⁶² Average maturities of loans from development banks are usually higher than those of other banks. Interest rates are also lower than those of other banks.

The CDC Group provides development finance (budget £750 million) with a limited focus on manufacturing; only 7% of the finance is allocated for industrial development and manufacturing projects. Within DFID's ambitions to support economic transformation, it would be logical that DFID supports the establishment of specialised IDBs emphasising the development of manufacturing subsectors in developing countries. Such support will be most efficient and effective if it is embedded in the framework suggested in Table 4 and Table 6 below.

⁶⁰ The use of the term 'development banks' is not universal. In some jurisdictions, such as China and Vietnam, DBs are known as policy banks. In Malaysia, they are called 'development financial institutions' (DFIs). In Latin America, they are referred to as public banks or DBs.

⁶¹ Te Velde, D.W. 2014. Note on Development Banks. Annex 2 in *The Future of UK Development cooperation: Phase 1 - Development Finance*. London: House of Commons HC 334.

⁶² Guadagno, F. 2016. The role of industrial development banking in spurring structural change. United Nations Industrial Development Organization (UNIDO), Department of Policy, Research and Statistics working paper 8/2016.

Subsectors and investment attraction

Countries and their manufacturing subsectors differ in their attraction to investments, FDI.⁶³ Okafor et al (2015) describe four locational motives of investment in developing countries.⁶⁴ The different motives have different implication for donor support and for growth and development impact.

There are countries that are *unattractive* to manufacturing investments due to small stagnant markets, fragility and conflict. Countries are considered too unstable for long-term substantial investment in manufacturing. Examples of such countries are Afghanistan, Iraq, Somalia, Sudan, South Sudan, Syria, Palestine OPTs and Yemen.

There are other countries that are attractive for *natural resource-seeking* manufacturing investments. Investors are interested in accessing and exploiting natural resources. For example, FDI is used for acquiring particular types of natural resources that are not available in their home country, like rich raw materials from extraction industries in Nigeria, Zambia, Ghana and Rwanda.⁶⁵

Market-seeking manufacturing investments are targeted at serving domestic or regional markets. International brands produce locally for local markets by adapting goods to local needs or tastes and to save the cost of serving a market from a distance. McKinsey estimates that three-quarters of the growth in potential manufacturing output would come from meeting intra-African demand and substituting imports of manufactured goods.⁶⁶ Examples of attractive countries for market-seeking manufacturing investment countries are DR Congo, Nigeria, South Africa, Tanzania, Rwanda and Sierra Leone.

Efficiency-seeking investments seek to benefit from factors that enable it to compete in international markets. This type of investment takes advantage of differences in the availability and costs of traditional factor endowments as well as of economies of scale and supply capabilities. Examples of such economies include Bangladesh, Ethiopia, Jordan, Lebanon and Vietnam.

It is important to note that that one country may be attractive for market-seeking investment in one subsector, while attractive for efficiency investments in other subsectors. Countries that are attractive for combined market- and efficiency-seeking are India, Indonesia, Ghana, Kenya, Malawi, Myanmar, Mozambique, Uganda and Zambia. Table 3 presents an assessment of the viability of subsectors in the country type categories with regard to investment attraction.

Investment attraction and development impact priority

Development impact is different for each attraction motive. Morrissey (2012) argues that the extractive sector has a lesser impact on economic growth than manufacturing related FDI.⁶⁷ This is despite the

⁶³ Dunning, J. (1973), The Determinants of International Production, Oxford Economic Papers, New Series, Vol. 25, No. 3 (Nov. 1973), pp.289-336

⁶⁴ Okafor, G., Piesse, J. and Webster, A. 2015. The motives for inward FDI into Sub-Saharan African countries. *Journal of Policy Modelling* 37(5): 875-890.

⁶⁵ UNCTAD. 2007. World Investment Report 2007: Transnational Corporations, Extractive Industries and Development. United Nations Conference on Trade and Development (UNCTAD). https://unctad.org/en/Docs/wir2007p2_en.pdf

⁶⁶ McKinsey Global Institute. 2016. Lions on the move ii: realizing the potential of Africa's economies. <https://www.mckinsey.com/featured-insights/middle-east-and-africa/lions-on-the-move-realizing-the-potential-of-africas-economies>

⁶⁷ Morrissey, O. 2012. FDI in Sub-Saharan Africa: Few Linkages, Fewer spill overs. *European Journal of Development Research* 24: 26–31.

extractive sector FDI being one of the largest and fastest growing forms of investment in sub-Saharan Africa.

Efficiency-seeking FDI is particularly important for countries looking to integrate into the global economy and move up the value chain. Efficiency-seeking FDI is not only export-oriented, but also key to export diversification. Nonetheless, the choice of sub-sectors is important for determining the impact of FDI and the potential for successfully attracting it. Based on a manufacturing sub-sector literature review and consultation with donors, MOs and experts and DFID's Country Expansion Analysis ('Where Invest Africa should expand in the future'), table 3 provides an assessment of investment attraction with regard to resource-seeking, domestic/regional market and global export/efficiency seeking investments for each of the earlier selected subsectors (see table 2). These investment opportunities apply both for domestic and foreign (FDI) investors.

Table 3: Investment attraction in manufacturing subsectors

Subsector	Resource-seeking investments *)	Domestic/regional market-seeking investments **)	Global export/efficiency-seeking investments ***)
Food and beverages	++	++	+
Wood and furniture	++	++	+
Paper and pulp	-	+	+
Textiles, clothing	-	+	++
Leather and footwear	+	++	++
Automotive	-	++	-
Basic metals and metal products	+	++	-
Glass and non-metallic products	+	+	+
Chemicals (rubber/plastic)	+	++	+
Machinery and equipment	-	++	-
Printing and publishing	-	+	-
Petroleum refining	++	++	+
Construction / cement	-	++	-
Pharmaceuticals	-	++	++
Electronics and precision equipment	-	++	+

Legend: ++ : High attraction + : Medium attraction - : No or very little attraction

*) Attractive countries for resource-seeking investments include Ghana, Nigeria, Rwanda and Zimbabwe

**) Attractive countries for domestic/regional market-seeking investments include DR Congo, Kyrgyz republic, Liberia, Nepal, Nigeria, Pakistan, Sierra Leone, South Africa, Tanzania, Tajikistan and Zambia.

***) Attractive countries for global export/ efficiency-seeking investments include Bangladesh, Ethiopia, Jordan, Lebanon and Vietnam. Combined market- efficiency seeking investment profile: India, Indonesia, Ghana, Kenya, Malawi, Myanmar, Mozambique, Rwanda, South Africa, Uganda and Zambia.

PART B: DEVELOPMENT OF MANUFACTURING SUPPORT PROGRAMMES

3. Setting a manufacturing programme framework

The previous chapters (Part A) of this document reviewed trends and prospects of manufacturing subsectors in developing countries. Part B introduces operational aspects and practical considerations for the actual development of DFID manufacturing support programmes. This begins with setting of an overall programme framework, which includes a country (or region)-specific selection of promising manufacturing subsectors and the identification of binding constraints in these manufacturing subsectors.

Most national governments in developing countries identified and prioritised manufacturing subsectors within larger macro-economic growth strategies. To promote programme effectiveness of DFID support programmes, it is essential to consider local initiatives and insights. The selection of manufacturing subsectors could also be complemented and compared with the various existing subsector analyses work of DFID, WB, UNIDO and ILO to name but a few.⁶⁸

The subsequent paragraphs provide suggestions for designing country-focused manufacturing programmes. However, the principles, approaches and issues are relevant to a broader set of DFID programmes which relate to manufacturing, e.g. regional programmes and issue specific programmes.⁶⁹

3.1 Prospects and opportunities for subsector development

Methods that can be useful in identifying suitable manufacturing sub-sectors to focus on include: an assessment of a country's revealed comparative advantage (which assesses a country's sector strengths based on trade data); complementary product-space assessment (which looks at a country's capability to produce one good based on the existing capability to produce similar goods); binding constraints analysis (which prioritises the challenges holding back economic growth); and enterprise mapping (which identifies the major firms operating in different sub-sectors and analyses trends in how they established themselves). This section describes how these approaches can be applied to programme development.

Recent theoretical and practical insights suggest the importance of explicitly focusing on a few key subsectors in support programmes instead. MOs specialised in industrialisation, such as UNIDO and ILO, systematically apply a subsector approach in their programming. Within these organisations, there is general agreement that promoting the manufacturing sector in a generic way is less effective and less efficient than having a subsector focus.

Revealed comparative advantage (static)

The optimal manufacturing structure in a country, which will make the country most competitive (based on its current economic opportunities), is determined by its endowment structure.⁷⁰ Consequently, the best way to upgrade a country's endowment structure is to develop its industries, and selected manufacturing subsectors, according to the comparative advantages determined.⁷¹ The

⁶⁸ The DFID-funded International Growth Centre (IGC) provides demand-led policy advice on manufacturing subsectors. The IGC country enterprise maps series offers a solid basis for selecting subsectors. See <https://www.theigc.org/> and <https://www.theigc.org/impact/mapping-industrialisation-africa/>

⁶⁹ Private Infrastructure Development Group (PIDG) for example

⁷⁰ Lin, J. Y. 2012. *New Structural Economics: A Framework for Rethinking Development and Policy*. Washington, DC: World Bank.

⁷¹ A country's endowment structure is not static, but will depend on the rate of capital accumulation and technological progress.

economy will be most competitive, the economic surplus will be the largest, and the capital accumulation and the upgrading of factor endowment structure will be the fastest possible.

There are various ways to assess comparative advantage. One way is to look into competitiveness of subsectors on markets. For instance, if a country's products are being successfully exported to global markets or are competing with imports in domestic markets with no government help, the country is sure to have a comparative advantage in these products. Similarly, if, without heavy government subsidies, an industry producing exports is attracting a growing amount of FDI, the country has a comparative advantage in those goods as well. Foreign direct investors have a keen sense of what countries produce that is competitive on international markets.

For existing products, the concept of revealed comparative advantage (RCA) can be used to pinpoint industries in which increased production could accelerate overall industrialisation. This is a traditional method based on a country's trade data. The RCA based on trade data can be determined either quantitatively using the Balassa index, after Balassa (1965),⁷² or qualitatively through the inspection of detailed import data. Details of the RCA method and one example of RCA note (Zimbabwe) is presented in Annex A.⁷³

Dynamics of comparative advantage; infant industries

Although the RCA view offers one practical approach as a basis for subsector selection, it is important to signal that countries' CA is dynamic and changes over time. The difference between the static traditional (Ricardian) view and the dynamic view on CA has important policy and subsector programme implications, for instance including a focus on *infant industries*.⁷⁴ The static view identifies the most efficient allocation of resources initially at one point in time. This existing comparative advantage provides a relatively easy focus area for manufacturing development in the short run, however, the reality in many developing countries is that their static comparative advantage goods, in most instances, happen to be agricultural commodities and natural resources.

The dynamic view, on the other hand, recognises that a country can shift its comparative advantage over time, including through government intervention, in ways that may improve its economic and social development. The promotion of domestic infant industries (which have little chance of competing head-to-head with the established firms located in the developed countries), for example through protection from trade competition, is based on a dynamic theory of comparative advantage.

In addition, the argument for protecting infant industries is that the management and organisational skills necessary to produce agricultural goods and natural resources are not the same as the skills and knowledge needed to build an industrial economy.⁷⁵ If true, then concentrating production in one's static comparative advantage goods would prevent the development of an industrial economy. Thus, one of the reasons for protecting an infant industry is to stimulate the learning effects that will improve productive efficiency. Furthermore, these learning effects might spill over into the rest of the economy as managers and workers open new businesses or move to other industries in the economy.

⁷² Balassa, B. 1965. Trade liberalization and 'revealed' comparative advantage. *The Manchester School of Economic and Social Studies* 33: 92-123.

⁷³ Several studies on comparative advantage exist, however, there is no coordination in studies for developing countries. IMC suggests developing a comparable series of RCA country notes for all country where DFID has presence.

⁷⁴ Suranovic. 2010. *International Trade Theory and Policy*. Irvington, N.Y.: Flat World Knowledge.
<http://internationalecon.com/Trade/Tch5/Tch5.php>

⁷⁵ Ibid.

In conclusion, an assessment of revealed comparative advantage can offer initial indications of sub-sectors on which to focus. However, developing more productive sector strengths may require active intervention. Such intervention has been key to the development of the industrial sector in more recent industrial success stories such as South Korea and Taiwan. However, such intervention needs to account of risks, including the industry failing to take off and the potential harm it can bring to consumers.

Product space

There is a point that ‘winning’ subsectors that are already successful with competing products at global and domestic markets may not need any further (donor) assistance. However, subsectors that are ‘nearby’ and still unlocked might be a more interesting target for donors’ support. A complementing approach to identify growth opportunities of these ‘nearby’ manufacturing subsectors is the ‘Product Space’ concept.⁷⁶ The underlying idea is that manufacturing (radically) new products is quite different from producing more of the same. Each product involves highly specific inputs such as knowledge, physical assets, intermediate inputs, labour training requirements, infrastructure needs, property rights, regulatory requirements or other public goods. Established manufacturing subsectors somehow have sorted out the many potential failures involved in assuring the presence of all of these inputs, which are then available to subsequent entrants in the industry. But firms that venture into new products will find it much harder to secure the requisite inputs and all required infrastructure.

Product space idea is the probability that a country will develop the capability to be good at producing one good is related to its installed capability in the production of other similar, or nearby goods where the current existing productive capabilities can be easily adapted.⁷⁷ Thus, the speed of structural transformation will depend on the density of the product space near the area where each country has developed its productive capabilities and its comparative advantage. If a country develops comparative advantage in a certain good, many firms can enter, producing an intra-industry spill over. In addition, these capabilities now shorten the distance to other goods, producing inter-industry spill overs.

As a conceptual tool, it can help DFID determine which products require productive know-how that is similar to the know-how a country already has. One such tool can be a map of the product space as presented in Annex C.

Once promising subsectors and product spaces in a country or region are identified, the next step in the development of a manufacturing support programme is to identify the binding constraints that hamper the subsector’s growth and development potential. This typically involves a context-specific multifaceted set of constraints, at different levels (macroeconomic, institutional, firm-level), some more important than others. It requires a holistic systemic view involving the “usual suspects” including finance, policies, institutional functioning and firm level limitations to name but a few. However, programmes attempting to address all issues at once often get stuck in a myriad of uncoordinated programme activities, measures and interventions without much of a prioritisation.

Hausmann et al.⁷⁸ acknowledged this downside of a holistic approach and developed an alternative growth-diagnostic model which focuses on addressing the most binding constraints in the formulation

⁷⁶ Hidalgo, C., Klinger B., Barabási A. and Hausmann R. 2007. The product space conditions the development of nations. *Science* 27: 317(5837):482-7. <https://www.ncbi.nlm.nih.gov/pubmed/17656717>

⁷⁷ Hausmann, R. & Klinger, B. 2006. Structural Transformation and Patterns of Comparative Advantage in the Product Space. KSG Working Paper No. RWP06-041; CID Working Paper No. 128. Available at SSRN: <https://ssrn.com/abstract=939646> or <http://dx.doi.org/10.2139/ssrn.939646>

⁷⁸ Hausmann, R., D. Rodrik and A. Velasco. 2005. *Growth Diagnostics*. Growth Lab Harvard University. Revised March 2005. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.446.2212&rep=rep1&type=pdf>

of economic policies and programmes. The argument is that it is seldom helpful to a long list of development interventions and institutional reforms; many of which may not be targeted at the most binding constraints on economic growth. Public means and programme budgets are better deployed in alleviating binding constraints than in going after too many targets all at once.

Moreover, Hausmann et al. stress that the binding constraints on economic activity differ from setting to setting. An identical growth strategy for all countries, regardless of their circumstances, is unlikely to be productive. Taking context-specificity into account is essential.

Manufacturing subsector growth-diagnostic tool

Whereas the Hausmann growth-diagnostic model is developed for overall economic policy frameworks, (see original decision tree in the Hausmann growth-diagnostic model Annex C), table 4 presents an adapted version targeted at manufacturing subsectors. This analytical framework is based on Hausmann's decision tree combined with insights of manufacturing subsector constraints in DFID's manufacturing programmes and programmes of other donors and multilateral organisations⁷⁹. It includes the essential elements from Hausmann's original decision tree such as human capital, infrastructure, property rights, corruption, taxes, political and fiscal stability, market failures, domestic saving, international finance and financial intermediation. Instead of breaking down the binding constraints along a decision tree, this variant suggests to breakdown, unravel and organise the binding constraints in a matrix with the following two dimensions.

Dimension 1 - Type of issue:

- Capital and technology issues, which relate directly to strengthening capital and technology capabilities of the firm.
- External and regulatory environment issues (non-financial and non-technology) refers to the institutional, policy, regulatory and administrative, and physical environment
- Issues concerning interactions between actors, including commercial and market linkages within a value chain as well as public-private dialogues, intermediary organisations and interactions with societal stakeholders.

Dimension 2 - Level and 'owner' of the binding constraint:

- Macro: the issues that concern the national government responsible for higher level policies, subsector priorities, long-term industrialisation vision. The macro level strengthens the institutional and physical context providing stability and trust for manufacturing firms in the long run.
- Meso: the issues that concern intermediary/local institutions actors related to the daily functioning of formal government institutions, market institutions, value chains, regulatory frameworks and intermediary institutions.
- Micro: the issues that concern firm level actors and single business units.

Enterprise maps

To identify and prioritise the situation and status of the binding constraint for each cell (table 4) in a certain subsector in a given country, DFID programme staff may consult the 'Enterprise Map' series developed by the DFID funded International Growth Centre (IGC) Alternatives may be locally available (such as that in Kenya produced by the Kenya Manufacturers Association) or compile similar work themselves. Enterprise Maps aims to provide a standardised descriptive account of the industrial capabilities of selected countries. The series provides practical information of the subsector in the

⁷⁹ See output A and B of the IMC manufacturing portfolio review.

country of study: the structure of the subsector, the supply and marketing chain, the policy context, the export status, the strength and potential, and the recent developments. Moreover, detailed profiles are provided of leading companies in the country's market, current activities and products, organisation and management, firm capabilities, competition, supply and marketing chain, exports, challenges and the development agenda. This provides a comprehensive view of the current frontier of industrial capabilities in the country. In particular, the history of each of these profiled companies is presented, so that the reader can trace the origins of current industrial capabilities. This helps identify trends which may inform the approach to encouraging new firms to grow or enter the market. The series is downloadable at: <https://www.theigc.org/project/the-enterprise-map-series/>.

If the enterprise map for a given country is not available or outdated, DFID field staff may coordinate the development of an enterprise map and engage specialised expertise. Relevant primary data may be collected via qualitative semi-structured interviews with firm owners within a subsector, government actors and other stakeholders. Additionally, a survey with a representative sample of the sector stakeholder allows the evaluation and prioritisation of the 'urgent' binding constrain in quantitative terms.

Development of future approaches to manufacturing support

One method by which DFID has identified manufacturing programmes is to assess the historical development of manufacturing sectors in further advanced countries and assess what factors have been critical to their success. For example, 'Invest Africa' was created based on the analysis that a) global manufacturing buyer networks were important but that developing countries are likely under-connected to them; b) FDI has been key in the growth of other industrialised countries, e.g. Bangladesh and Vietnam. Undertaking further similar analysis may reveal other promising ways of supporting the sector. This could be led by central policy and/or research departments.

Table 4: Binding constraint diagnostics for manufacturing subsectors

	Capital and technology			External and regulatory environment		Interactions between actors	
Type Level	Capital accumulation of the firm	Human capital of the firm	Technology/ standards and innovation	Institutional context	Physical environment context	Business and market linkages	Public-private linkages
Macro	Inappropriate financial policies (e.g. interest rates) that weaken firms' capability to invest or secure FDI for manufacturing. Political and fiscal instability in the country providing insufficient trust for FDI and domestic investment.	National education and training policies do not focus on strengthening human capital of manufacturing firms (advanced and practical technical skills and management).	Weak national science, technology and innovation policy framework supporting firms to innovate. Weak or no manufactured product standards framework and enforcement.	No or weak national subsector priorities and overall manufacturing strategy. Industrial policies not designed according to revealed comparative advantage and product space of the subsector.	Underdeveloped national transport system, infrastructure, energy and water provision.	Unfavourable export policies for domestic manufacturing firms. Conflicting trade and market liberalisation policies, or global issues such as restrictive WTO rules and industrial standards.	Insufficient public-private policy dialogues (PPPD) on economic (manufacturing) agenda Limited social dialogue between government and civil society actors on labour rights, gender equality and environmental issues.
Meso	Insufficient functioning of banks and financial institutions for providing finance to manufacturing firms (bureaucratic procedures, low risk appetite, high interest rates etc.) Firm's limited access to investment (domestic and FDI) and working capital.	Weak capability of (non-) commercial local business development services and NGOs providing management services and consultancies. Weak capability of private and public education and training institutes (management, technical, practical) system strengthening human capital of manufacturing firms.	Weak transfer of knowledge via science and technology institutions, universities, research centres. Weak professional technical training for industry standards. Weak innovation system institutions (Science and Technology, R&D).	Weak functioning of operational gov. institutions (corruption, low skills) for business licences, property rights, taxes No standards setting and firm-level verification testing facilities Non-functioning export regulations and customs procedures	Few or no special Economic Zones (SEZs) available and in operation; bad SEZ design / management. Little space and facilities for industrial clustering	Poor access to business and industrial clusters and networks. Market failures (information externalities and coordination externalities) Difficult entry and integration into global value chains.	Weakly developed and ineffective intermediary business support organisations, branch associations and trade/labour unions
Micro	Limited financial management knowledge of managers to secure investment in manufacturing.	Management knowledge and skills of managers is insufficient to run manufacturing enterprises. Insufficient (advanced) technical skills of workers.	Few innovation initiatives and risk-taking within firms. No technology integration. Quality standards procedures are not known about or observed within the firm.	Informal institutions imply negative attitudes and perceptions in society towards manufacturing.	Limited availability of land or possibility to construct manufacturing plants and workshops.	Few or no linkages with and limited access to local value chain and industrial clusters.	Local authorities are not concerned with business interests of manufacturing sector. Manufacturers do not trust local authorities. Low motivation to comply with labour laws.

4. Support approaches and methodology

After having identified the promising subsectors in a country or region, and the associated binding constraints, next is the design and formulation of operational details of the approach and methodology to address the binding constraints. The mechanisms to address the binding constraints in a DFID programme are typically presented in the format of a logical framework, setting the overall outcomes and impact as well as output (results) and inputs (activities) of a programme.

A notable observation, as an outcome of the analysis of DFID's portfolio of manufacturing programmes, is that programmes do not have specific outcomes and outputs defined with regard to the manufacturing sector development.⁸⁰ Or manufacturing support concerns are fragmented and there are implicit activities within programmes. However, if DFID is to ramp up its work on structural transformation successfully, it is essential for programmes with a strong manufacturing focus to be explicit about the manufacturing targets in the logical framework.

4.1 Manufacturing programme outcomes

Essential in the design of support programmes is the inclusion of manufacturing-specific indicators, particularly in programmes with a primary focus on manufacturing. The section below provides examples of logframe indicators which could be used for programmes with a manufacturing component.

The most evident (and used) measures of structural transformation are GDP, value added, employment, investment and export to measure structural transformation⁸¹. Examples of the operationalisation of manufacturing programme outcomes to include in the logical framework are suggested in table 5 on the next page.

As mentioned, limited reference is made to the indicators suggested in table 5 in DFID's current portfolio of manufacturing programmes. Some programmes such as 'Invest Africa' and CDC are reporting on indicators on investment in manufacturing as a whole. Many more programmes involve job creation, but these are not linked to manufacturing. More often, programmes define indicators that are directly linked to the programme activities, such as the number of laws and regulations adopted, the number of beneficiaries trained, or number of businesses established.

There is a strong case to include manufacturing-specific indicators assessment for the targeted subsectors in the log frame of a programme. This implies the inclusion of these indicators in baseline studies, and monitoring, evaluation and learning (MEL) studies (see also paragraph 5.2). This will allow DFID to attribute programme activities to the manufacturing subsectors in terms of GDP figures and employment. For instance, the direct job creation of a programme might be low; the (proximate) indirect jobs may also be low; but the argument of structural transformation is that that the (non-proximate) indirect jobs are high. Measuring manufacturing-specific indicators will provide broader insight and enable structural transformation impact assessment of manufacturing support programmes.

⁸⁰ IMC. 2018. Output A: Analysis of DFID manufacturing programmes portfolio.

⁸¹ UNCTAD 2016. Virtual institute teaching material on structural transformation and industrial policy. United Nations Conference on Trade and Development (UNCTAD). United Nations: New York and Geneva, <https://vi.unctad.org/stind/indpolfull.pdf>

Table 5: Suggested manufacturing-specific programme indicators to include in the logical framework

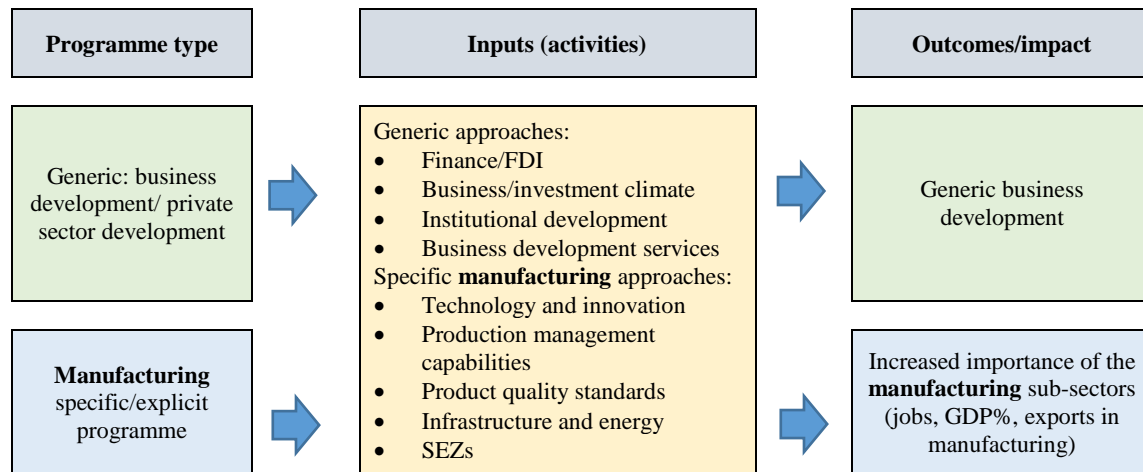
Log frame outcomes	Unit/measure
GDP:	
- Growth of manufacturing subsector GDP	Absolute figures in local currency and share (%)
- Contribution of manufacturing GDP to total GDP	Share (%) of total GDP
Value added:	
- Value added growth of manufacturing subsector	Absolute figures in local currency and share (%)
- Share of manufacturing in total value added	% of total value added
Investment in manufacturing:	
- Amount of (domestic and foreign) investment generated	Absolute investment
Employment:	
- Direct job creation in manufacturing subsector	# of jobs and description of job quality
- Proximate and non-proximate job creation	% of employment
- Share of employment in manufacturing in total employment	
Export:	
- Export growth in manufacturing subsector	Growth (%) in manufacturing export volume per subsector (%).
- Share of manufacturing in total export	

4.2 Manufacturing programme inputs

Manufacturing can best be promoted through a comprehensive approach addressing various issues at various levels in a coordinated way. The framework below provides a useful structure for developing manufacturing programme activities that target problems identified through the earlier analytical process.

Support programmes involving inputs with a primary focus on manufacturing, or as a subcomponent, which happens often in generic private sector development programme. Generic private sector support inputs, such as improving finance, infrastructure and the business climate, that are critical for business in general, and for manufacturing as well. In addition, there are support inputs such as production technology, product manufacturing standards, subsector-focused integration in global value chains that relate more to manufacturing (there is however not a strict line between generic and manufacturing support approaches). Figure 3 suggest that both require a combination of generic and manufacturing-specific approaches.

Figure 3: Respective types, approaches and impacts of generic and manufacturing programmes



Selection of programme inputs

The types of support input (activities) to include in the logical framework of a programme could be based on the earlier identified binding constraints of the prioritised subsector (table 4). The matrix in table 6 provides various suggestions of types of manufacturing-specific activities, which are based on analysis of DFID's existing manufacturing portfolio and those of other donors and MOs.⁸² It should be noted that the matrix below suggests manufacturing-specific input/activities for support programmes.

Similarly, to the identification of the binding constrain in table 4, programme inputs could be structured and organised along the same dimensions.

Dimension 1 - Type of activities and inputs:

- Strengthening financial and human capital and technology capabilities of the firm.
- External and regulatory environment issues (non-financial and non-technology).
- Promoting and streamlining interactions between actors in respect of commercial and market linkages as well as public-private dialogue, intermediary organisations and interactions with societal stakeholders.

Dimension 2 - Level of issue (target group or beneficiary of the activity and input):

- Actors within the government responsible for higher level policies, subsector priorities, long-term industrialisation vision.
- Intermediary/local institutions actors related to the daily functioning of formal government institutions, market institutions, value chains, regulatory frameworks and intermediary institutions.
- Micro: firm level actors and single business units.

⁸² See output A and B of the IMC manufacturing portfolio review.

Table 6: Suggested manufacturing-specific input/activities for support programmes

	Capital and technology			External and regulatory environment		Interactions between actors	
Actor level	Capital accumulation Return on investment	Human capital	Technology/ standards and innovation	Institutional context	Physical environment context	Business and market linkages	Public-private linkages
Macro	To support the government to develop financial policies established (e.g. interest rates) that promote domestic savings and attracting FDI for investing in manufacturing.	To strengthen business management education focused on manufacturing and technology innovation. To improve collaborative attitudes within government toward private sector and manufacturing businesses.	To support government in manufacturing, technology and innovation policy frameworks and priorities. To strengthen development and enforcement of national standards for manufactured processes and products.	To support government in establishing higher-level industrial policies on promising subsectors, overall manufacturing strategy To promote manufacturing sector research and evidence-informed policy making.	To support infrastructure including Special Economic Zones (SEZs) and national energy provision programmes for manufacturing enterprises.	To support government to development (international) trade and market liberalisation policies for manufactured products To communicate global issues such as WTO rules industrial standards.	Policy dialogue, enhancing political commitment to economic transformation through FDI. To create a platform for social dialogues with stakeholders about societal issues including labour rights, environmental impact in manufacturing
Meso	To establish or support a fund/facility providing grants and loans to private enterprises including loan guarantees. To enable affordable access to credit for manufacturers through support for industrial development banks (financial deepening).	To establish commercial and not-for-profit local business development services, consultancies and NGOs (intermediate organisations) providing management services and consultancies to manufacturing firms.	To promote the transfer of knowledge via science and technology institutions, universities, research centres To conduct professional technical training for industry standards. To support innovation system institutions (S&T, R&D)	To support the functioning of operational government institutions for standards setting To streamline export regulations for manufactured products. Import regulations for inputs (customs procedures)	To strengthen the functioning of maintenance of regional infrastructure specially targeted at manufacturing. To set up or support subsector industrial clustering in designated areas.	To set up manufacturing clusters and B2B networks To promote the manufacturing's integration into global value chains	To strengthen branch associations and trade/labour unions
Micro	To provide finance and finance-related management skills to manufacturing enterprises (e.g. financing technology acquisition) To raise awareness of potential investments adopting a “deal-making” approach	To develops technical and management skills of staff and managers is sufficient to run manufacturing enterprises (subsector strategy, manufacturing production, human resources, marketing, innovation, technology acquisition, upgrading)	To provide tailored Technical Assistance (TA) to promote technology and innovation (quality standards and compliance)	To change negative attitudes and perceptions in society (informal institutions) towards manufacturing.	To support/facilitate availability of housing and manufacturing workshop construction	To support integration on local (value chain/clusters) linkages To support global (value chain/UK business/FDI) manufacturing programmes create commercial links with UK firms	To facilitate compliance with labour laws To facilitate contacts with local authorities

4.3 Societal issues and challenges

Safeguarding society from harmful impacts as a result of manufacturing development is a prerequisite. Manufacturing programmes should explicitly promote the position of women in the sector, assure good social and labour conditions and practices and prevent environmental degradation. This paragraph discusses considerations, suggestions and examples of addressing societal issues and challenges.

Against the background of DFID's inclusive development agenda, it is essential that successful expansion of the manufacturing subsector in developing countries generates positive societal change, while not causing harm, particularly for vulnerable groups in society or on the environment⁸³. Special attention, therefore, is required to address gender, labour and environmental issues in the design and implementation of manufacturing programmes.

In DFID's current portfolio, 67% of the programmes mention the inclusion of explicit gender considerations, 24% report that they address social and labour conditions and 30% address environmental issues. A further qualitative exploration into these numbers⁸⁴ reveals that there are various degrees and levels to which societal issues and challenges are addressed. This section summarizes considerations and suggestions from DFID existing programmes and those of other donors and MOs, to address societal issues in manufacturing support programmes.

Promote gender equality

The UN's SDG#5 states that gender equality is a necessary foundation for a prosperous and sustainable world. In manufacturing, several particular gender issues are at play requiring particular attention. Table 7 presents an overview of such typical gender issues in manufacturing in developing countries and approaches or safeguards how these issues could be addressed. While women's participation and ownership of smallholder enterprises is widely seen in the informal sector in most developing countries, it is less common in more advanced and larger manufacturing industries.⁸⁵

There are several programmes currently implemented by DFID, other donors and MOs, that include the approaches as suggested in Table 7. For example, the DFID programme 'Afghanistan Investment Climate Programme (AICP/300175)' addresses legal and regulatory barriers constraining women and girls' entry to set up enterprises, with a view to promote female ownership. UNIFEM's programme 'Women Global Innovation Coalition for Change' identifies the key barriers to women and girls' advancement in innovation, technology and entrepreneurship,⁸⁶ which enables women to attain higher management and technical positions. The WB's 'Women Entrepreneurs Finance Initiative (We-Fi)' addresses obstacles faced by women entrepreneurs, in manufacturing amongst others, through innovative and tailored financial instruments, including guarantee mechanisms. ILO implements the 'Women's Entrepreneurship Development (WED)' programme⁸⁷, which is a more generic programme. It promotes changes in both women's access (to the opportunities, services, and assets

⁸³ Noting that there may in some cases be a trade-off to be made between supporting manufacturing growth and protecting the environment / managing climate change.

⁸⁴ Output A of the DFID's Manufacturing Portfolio Review: the spreadsheet includes a descriptive part of how the various manufacturing programmes of DFID address societal issues.

⁸⁵ Yong, L. 2017. Africa's industrialisation: leaving no woman behind. OECD blog <https://oecd-development-matters.org/2017/04/25/africas-industrialisation-leaving-no-woman-behind/>

⁸⁶ <http://www.unwomen.org/en/how-we-work/innovation-and-technology/un-women-global-innovation-coalition-for-change>

⁸⁷ <https://www.ilo.org/empent/areas/womens-entrepreneurship-development-wed/>

required to sustainably upgrade one's economic standing) and in agency (capacity and confidence to act on available opportunities, and to influence decision-making at various levels).

Table 7: Gender issues and approaches to promote gender equality in manufacturing programmes.

Gender issues in manufacturing	Programme (logframe) approaches and guarantees to promote gender equality
Low female employment rates manufacturing firms. Women represent only 38% of the manufacturing workforce in Africa. ⁸⁸	<ul style="list-style-type: none"> - Setting female employment rate targets and standards in programme as logframe indicators. - Understanding (and correcting) uneven female employment rates in different contexts. (N.B.: Female employment rates apparently are higher in FDI SEZ manufacturing than in domestic manufacturing.⁸⁹)
Low representation of women in higher executive and management positions, including higher qualified technical engineering jobs.	<ul style="list-style-type: none"> - Dissemination of knowledge and scientific insights about the advantages of diversity in management and technical positions of the workforce.⁹⁰ - Tailors education and training. - Set female management and technical positions. ambitions and standards in programme indicators.
Unequal remuneration for men and women in manufacturing industries.	<ul style="list-style-type: none"> - Setting equal pay targets and standards in programme logframe indicators. - Requirement of publishing sex segregated remuneration data.
Limited personal development opportunities within manufacturing firms	<ul style="list-style-type: none"> - Inclusion of HRM focused on women's careers in business plans. - Management and technical education.
Poor (gender sensitive) working conditions and social protection.	<ul style="list-style-type: none"> - Working hours in manufacturing enterprises do not match other roles of women in society (child and family care and community management).
Limited female ownership in formal larger manufacturing firms ⁹¹ due to legal/regulatory constraints.	<ul style="list-style-type: none"> - Addressing legal and regulatory barriers constraining women and girls' entry to set up enterprises.
Lower access (than men) to formal credit limits female entrepreneurs to graduate their (informal) businesses to formal larger manufacturing firms.	<ul style="list-style-type: none"> - Tailored credit programmes - FDI and domestic investment promotions focused on female entrepreneurs in manufacturing. - Providing guarantees
Traditional gender roles limit women to graduate their informal businesses into larger formal manufacturing firms.	<ul style="list-style-type: none"> - Awareness raising campaigns.

⁸⁸ UNIDO. 2016. Industrialization in Africa and Least Developed Countries - Boosting growth, creating jobs, promoting inclusiveness and sustainability. A report to the G20 development working group by UNIDO. Vienna: United Nations Industrial Development Organization.

⁸⁹ Women often predominate in the SEZ workforce, with women comprising an average of 60-80 % of the total workforce in zones globally (see Farole, T. 2011. Special Economic Zones in Africa: Comparing Performance and Learning from Global Experience. Washington DC: World Bank). This is largely due to the type of unskilled labour opportunities created and it provides real opportunities to bring women into formal, salaried employment.

⁹⁰ Ritter-Hayashi, D., Vermeulen, P. A. M., & Knoben, J. 2016. Gender Diversity and Innovation: The Role of Women's Economic Opportunity in Developing Countries. (DFID Working Paper). Nijmegen: Radboud University Nijmegen.

⁹¹ While women's ownership of smallholder enterprises is widely seen in the informal sector in most developing countries, it is less common in more advanced and larger manufacturing industries. See: Yong, L. 2017. Africa's industrialisation: leaving no woman behind. OECD blog <https://oecd-development-matters.org/2017/04/25/africas-industrialisation-leaving-no-woman-behind/>

Labour issues

UN SDG #8 advocates the promotion of decent work opportunities and the creation of the conditions that allow people to have quality jobs. A particular priority in the context of manufacturing promotion is creating stable jobs while safeguarding labour conditions. Harsh working conditions in developing countries pose challenges around manufacturing promotion.⁹² Labour conditions and labour rights in general are under stress because power has shifted from producers to traders and retailers and local laws regulating labour markets have limited effect.⁹³ Limited enforcement, often due to resource constraints, raises the importance of understanding firm-level decisions concerning working conditions.⁹⁴ A priority is compliance with labour standards in manufacturing programmes, including social security systems and labour protection. Table 8 presents an overview of labour issues that typically emerge in manufacturing programmes in developing countries and approaches and guarantees on how these issues could be addressed by manufacturing support programmes.

Table 8: Labour issues and approaches to safeguard good labour practices in manufacturing.

Labour issues in manufacturing programmes	Programme (logframe) approaches and guarantees to promote labour issues
Labour rights: unregulated employment contracts, long working hours, no right to unionise).	<ul style="list-style-type: none"> - Building the Government's capacity to strengthen design of and implement labour rights policies and regulatory frameworks. - Supporting the establishment or strengthening of trade unions, workers unions or branch associations (this may be politically sensitive).
Unhealthy and dangerous labour conditions in developing countries.	<ul style="list-style-type: none"> - Building the Government's capacity to regulate safety and labour standards. - Supporting the establishment or strengthening of trade unions, workers unions or branch associations. - Linking up with international certifications and labour protection control systems.
Social security systems and labour protection.	<ul style="list-style-type: none"> - Assistance to Government in its efforts to strengthen social security such as access to health care and income security (old age, unemployment, sickness, invalidity, work injury or maternity) - Development of firm-level social security provisions.
Low pay of workers	<ul style="list-style-type: none"> - Strengthening the bargaining position at production side of GVCs via clustering of enterprises. - Publish payment standards open access.
Child labour (see a box 4 below). ⁹⁵	<ul style="list-style-type: none"> - Supporting children's rights through education/media.

Several programmes of DFID, other donors and MOs currently implement the above-mentioned approaches. current example of a DFID programme that addresses labour conditions is 'Better Jobs

⁹² Brown, D., Dehejia, R. and Robertson, R. 2016. Laws, Costs, Norms, and Learning: Improving Working Conditions in Developing Countries. IZA Discussion Paper No. 10025.

⁹³ Ali, R. & Katkar, A. 2015. Globalization positive or negative? - Efforts to eradicate unjust and unfavourable working conditions beneath Globalization. Blog <http://romiyaaliandaayushkatkar.blogspot.com/2015/>

⁹⁴ Brown, D., Dehejia, R. and Robertson, R. 2016. Laws, Costs, Norms, and Learning: Improving Working Conditions in Developing Countries. IZA Discussion Paper No. 10025.

⁹⁵ Children are involved at the end of supply chains producing for domestic markets, in home-based, informal work to assemble parts of finish products in a wide range of industries (See: ILO. 2002. A Future Without Child Labour: Global Report Under the Follow Up to the ILO Declaration on Fundamental Principles and Rights at Work. Geneva: International Labour Organisation).

in Bangladesh (205275)', implemented in collaboration with ILO. The programme works with garment factories to improve safety standards as well as occupational health and safety practices. In addition, the programme builds the government's capacity to regulate safety and labour standards in all factories in Bangladesh. It pushes for the adoption of compliance standards in participating factories. A related programme of ILO/IFC is 'Better Work' which aims to improve labour standards and competitiveness in global value chains in Bangladesh, Cambodia, Egypt, Ethiopia, Haiti, Indonesia, Jordan, Nicaragua and Vietnam. ILO/IFC carries out such programmes via direct support to enterprises and via dialogue among government, employers, trade union, labour unions and other partners.

Box 1: Child labour in garments, a t-shirt printing company in Bangladesh⁹⁶

The company in Chittagong prints letters, shapes and figures on textiles for T-shirts, as subcontract orders for domestic garment industries, who in turn produce for large international buyers. The company has 40 employees, who all live nearby – “they are hard-working and loyal”. The company employs children too of around 14 years of age. The owner mentions that their families force him to employ them. He believes it is better that they work in a company since they lack government or other support – “they are not educated, and they have nothing to do. If they do not work in a company, they do illegal work like selling drugs or theft.”

The owner stresses that on the one hand the international buyers force local producers to comply, but on the other, they continuously negotiate the price down - “we fulfil their requirements, but we get lower payments for our work after all. We do not get a fair share.” The larger garment industries in Bangladesh do not have any child labour due to international pressure, only small subcontractors like his company. Sometimes the international buyers also come to visit the subcontractor – “someone is watching out and then we hide the working children.”



The imposed compliance is not making things better for the work force at the small producers' side in Bangladesh. In his view, the government is not developing policies to promote the sector for the benefit for Bangladesh, nor to solve the compliance issue – “they do not bother, they are busy taking money though corruption. To improve the compliance challenges of the sector, the owner feels that non-government garment-related organisations and garment trade bodies are better placed and committed to look after the industry.

Environmentally sound production

Manufacturing in developing countries is very often associated with severe environmental degradation, high levels of pollution and negative impacts on public health.⁹⁷ The manufacturing processes currently being employed in most developing countries have a number of characteristics that render them unsustainable in the long term. These include outdated infrastructure, machinery and inefficient methods, which generate high levels of pollution and widespread environmental degradation, as well as inefficient use of energy and natural resources and high levels of carbon emissions. They are also responsible for affecting the health of the general population through toxic

⁹⁶ Voeten, J. & Nurul Absar, M. 2018. Bangladesh: Qualitative study on Innovation in Manufacturing Small and Medium Sized Enterprises (SMEs): Exploration of Policy and Research Issues. DFID research project “Enabling Innovation and Productivity Growth in Low Income Countries (EIP-LIC)”, Tilburg: Tilburg University.

⁹⁷ Pure Earth and Green Cross. 2016. World's Worst Pollution Problems 2015 - The New Top Six Toxic Threats: A Priority List for Remediation. Pure Earth and Green Cross Switzerland. https://www.greencross.ch/wp-content/uploads/uploads/media/pollution_report_2015_top_six_wwpp.pdf

contamination of vital resources, such as: air, drinking water, soils, food crops, livestock and fish. In future years, building a manufacturing sector that is efficient, technologically innovative and sustainable, both in environmental and social terms, will be crucial to ensuring continued economic growth and improving well-being in developing countries.⁹⁸

Table 9 presents an overview of environmental issues that typically emerge in manufacturing programmes in developing countries and approaches and guarantees on how these issues could be addressed DFID programmes.

Table 9: Environmental issues and approaches to address these in manufacturing programmes.

Environmental issues in manufacturing programmes	Programme (logframe) approaches and guarantees to address the environmental issues
Environmental protection policies of Government are often inappropriate or not effectively implemented. Enforcement and control techniques are not yet fully developed.	<ul style="list-style-type: none"> - Identification and adoption of suitable policy-based interventions targeted at manufacturing firms by Government at various levels. - Capacity development of environment policy-making and regulation enforcement agencies.
Manufacturing firms pay little attention to environmental protection and standards.	<ul style="list-style-type: none"> - Awareness activities and campaigns and knowledge dissemination for business owners and workers. - The development of business models that include environmental costs and concerns.
Polluting production processes and technology in manufacturing and industrial activity.	<ul style="list-style-type: none"> - Development and application of technology-based solutions, cleaner production methods and systems that will reduce the environmental impact and pollution generated by manufacturing. - Promotion of 'leapfrog' technological and frugal innovations.⁹⁹
Environmental degradation and resource depletion.	<ul style="list-style-type: none"> - The development and application of technology-based solutions involving less (more efficient) use of natural resource or alternative inputs. - Promotion of circular economy.
Accumulation of harmful environmental problems concentrated in SEZs and industrial areas.	<ul style="list-style-type: none"> - Integrated approach of greening of industrial parks and SEZs,
Lack of data and information about the environmental impacts of manufacturing.	<ul style="list-style-type: none"> - Generation of evidence to support practical solutions, including evidence on the environmental, economic and social impacts and the social and political economy influences that drive environmental changes.

Several programmes of DFID, other donors and MOs currently implement the above-mentioned approaches. The DFID manufacturing programme 'Sustainable Manufacturing and Environmental Pollution (SMEP/300124)', contributes to the identification, development and application of technology-based solutions, cleaner production methods and systems that will reduce the environmental impact and pollution generated by manufacturing in developing countries. The GIZ programme 'Sustainable and environment-friendly industrial production (SEIP)' provides support for greening India's industrial zones through individual zone support, policy reform. It proposes new

⁹⁸ DFID, 2018, Business case of the programme "Sustainable Manufacturing and Environmental Pollution (SMEP)". <https://devtracker.dfid.gov.uk/projects/GB-GOV-1-300124/documents>.

⁹⁹ Leapfrogging (innovation) refers to skipping inferior, less efficient, more expensive or more polluting technologies and manufacturing processes and move directly to more advanced ones. Through leapfrogging developing countries can avoid environmentally harmful stages of development and do not need to follow the polluting development trajectory of industrialized countries. See: <https://www.worldbank.org/en/news/opinion/2017/10/11/africa-can-enjoy-leapfrog-development>

measures for the policies, plans and support programmes intended to prevent or reduce pollution and to improve resource efficiency in industrial zones. An IFC programme example is the ‘Partnership for Cleaner Textile Programme (PaCT)’ in Bangladesh supports the textile industry in adopting cleaner production. UNIDO could be interesting in the framework of its green industry initiative¹⁰⁰ and the promotion of the circular economy in several of its programmes.

¹⁰⁰ https://www.unido.org/sites/default/files/2010-11/Green_Industry_Initiative_0.pdf

5. Organisational implications

5.1 DFID's spending on manufacturing support

While there is a large variation between DFID countries in terms of spending on manufacturing support, most countries lack a dedicated manufacturing programme. This includes some countries with significant manufacturing potential – such as Pakistan and Myanmar. To reflect DFID's commitment to supporting “economic transformation”, consideration should be given to developing and implementing programmes with a primary and explicit focus on manufacturing in more target countries.

DFID is implementing 72 manufacturing and manufacturing-related programmes at present. Among the programmes, only a minor share of 13 programmes has a primary focus on manufacturing (i.e. >50% of spend is on manufacturing), whereas 20 programmes have a partial focus and 39 programmes a limited focus on manufacturing. Apart from the relatively low number of primary focus programmes, DFID's portfolio of manufacturing programmes also shows many fragmented and implicit support activities and variation in spending among the different central department and countries where DFID has presence.¹⁰¹ In these programmes, the manufacturing component is often side-lined with no specific manufacturing indicators defined in the logframe.

There is also a relatively unequal geographical spread of programmes across countries. Some DFID country offices have large economic development programmes, but the manufacturing components are relatively small (including Pakistan and Myanmar). Other DFID country offices have low spending on manufacturing programmes such as in Afghanistan, DR Congo, Caribbean, Lebanon, Malawi, Mozambique, Myanmar, Nepal, Palestine OPTs, Tanzania, Somalia, Syria, Tajikistan, Zambia and Zimbabwe. DFID country offices with no manufacturing programmes are Indonesia, Iraq, Jordan, Kyrgyz Republic, Liberia, Sierra Leone, South Sudan, Sudan and Yemen.

Only six DFID country offices implement large manufacturing support programmes, namely Bangladesh, Ethiopia, Ghana, India, Rwanda and Uganda. Financial details of the programmes are presented in table 10.

Table 10: DFID economic development in large manufacturing programmes.

	DFID's total economic development spend 2018/2019 (A)	Manufacturing spend in programmes (B)	Yearly spend on manufacturing (C=B/6.5 *)	Share of economic development spend for manufacturing (= C/A*100%)
Bangladesh	£42.5 million	£61.8 million	£9.5 million	22.4%
Ethiopia	£51.3 million	£78.2 million	£12.0 million	23.5%
Ghana	£41.5 million	£18.0 million	£2.7 million	6.7%
India	£44.2 million	£36.1 million	£5.6 million	12.6%
Rwanda	£57.0 million	£19.0 million	£2.9 million	5.1%
Uganda	£100.5 million	£43.0 million	£6.6 million	6.5%

(Source: Annex 3 in the narrative summary Activity A)

*) the average duration of manufacturing programmes is 6.5 years.

As DFID aims to develop a more substantial portfolio of manufacturing support programmes, it should look to implement programmes with a primary and explicit focus on manufacturing in more countries. The last column in table 10 shows the share of DFID country offices spend on manufacturing as a

¹⁰¹ IMC. 2018. Analysis of DFID manufacturing programmes – Report Output A

portion of overall spending on economic development. There may be a case for other countries which have not received significant manufacturing spend, but which do have significant manufacturing potential, to consider increasing this share towards a larger level of say 10-15% of the overall country budget for economic development.

With the exception of the fragile states and conflict areas (Yemen and South Sudan for instance), there is likely to be a case for increased focus on supporting manufacturing activity, reflecting an analysis of revealed comparative advantage and investment attraction potential, as discussed in chapter 3. Table 11 highlights those countries where DFID has low spending on manufacturing and assesses the case for it spending more there. It differentiates between resource-seeking, domestic/regional market-seeking and global export efficiency-seeking manufacturing support programmes.

Table 11: Countries where there is scope for manufacturing support programmes.¹⁰²

	Large potential	Medium/low potential
Resource-seeking	Zambia	Zimbabwe
Domestic/regional market-seeking	Indonesia, Jordan, Kyrgyz republic, Myanmar, Pakistan and Tajikistan.	Iraq, Liberia, Nepal, Tanzania, Malawi, Mozambique, Zambia and Zimbabwe
Global export efficiency-seeking	Indonesia, Jordan, Lebanon and Myanmar	Kyrgyz republic, Jordan Caribbean and Mozambique
Fragile states (conflict) with low potential	Afghanistan, DR Congo, OPTs and Sierra Leone, Syria, Somalia, South Sudan, Sudan and Yemen	

Manufacturing in larger private sector development programmes

It is not only necessary to extend the number of programmes with a primary focus on manufacturing. With regard to programmes with a partial and limited focus or generic private sector component programmes, it is possible to include explicit manufacturing subsector(s) promotion components and the indicators mentioned in paragraph 4.1. There are for instance several very large DFID programmes where this can take place.

One such example is the Private Investment Development Group (PIDG) implemented by the DFID's central Private Sector Department (PSD).¹⁰³ The 6-years programme's budget is £415 million and aims to mobilise private investment in infrastructure, in order to increase service provision for the poor, boost economic growth, trade and jobs to alleviate poverty in the world's poorest countries. The programme has a partial focus on manufacturing (estimated £103 million) but no prioritised subsectors or explicitly defined manufacturing targets.

¹⁰² The assessment of the 'scope for manufacturing' in table 11 is based on the author's sources of information and various views shared by experts in the field, acknowledging that different interpretations are possible.

¹⁰³ <https://devtracker.dfid.gov.uk/projects/GB-GOV-1-300351>

Another programme of PSD is the co-funding of the CDC Group (public limited company).¹⁰⁴ CDC is a development finance institution that provides patient capital equity and debt investments. DFID has provided £757 million over 23 years to catalyse the market for impact investment in Sub-Saharan Africa and South Asia. Impact investments are those which have both a financial and social return by benefitting poor and low-income people through improved access to affordable goods and services and income generating opportunities. A proportion of the funds which make direct investments into businesses that are highly developmental/transformational. The other part supports market building. Technical assistance is also being made available to the underlying investees. CDC explicitly monitors the number of manufacturing projects funded. DFID could consider encouraging CDC to explore ways of increasing its focus on manufacturing, for example through seeking a manufacturing-focused fund to invest in or stating its ambition to increase manufacturing as a share of its overall portfolio.

5.2 Internal coordination of central DFID departments

Explicit internal coordination of manufacturing programmes, in particular through collection and sharing of economic data on subsectors and indicators, would improve overall delivery.

The analysis of DFID's manufacturing and related programmes under the portfolio review highlights that the manufacturing support activities are scattered around the many programmes implemented by DFID country offices and central departments. Building on existing engagement across the organisation, improvements in the design, coherence, and effectiveness of these manufacturing programmes could be achieved through improved internal coordination, stronger gathering and sharing of information, and provision of analytical support. The planned 'Invest Africa' contract should help facilitate this.

A logical step could be the establishment of an internal coordination point/platform that shares accessible information and comparable insights of manufacturing programmes and the associated support approaches, best practices and so forth. The further maintenance and updating of the existing database (spreadsheet) of manufacturing programmes (Output A) could be one activity. This database enables the publishing of regular summary reports presenting trends, outcomes, impacts, challenges etc. of DFID manufacturing programmes.

Moreover, the central point/platform could keep track of manufacturing research within the programmes (and more widely) and systematically store data. Most DFID programmes already include monitoring, evaluation and learning (MEL) and research components. Carefully designed, systematic manufacturing research could improve on this. This could include:

- Research on subsectors, RCA and product space per country (paragraph 3.1) with a view to develop a central DFID database to be utilised by country office staff for the design of future subsector-focused manufacturing programmes and set programme targets accordingly.
- Qualitative – quantitative research into selected subsectors and enterprise maps to identify and prioritise the binding constraints (paragraph 3.2). Such combination of qualitative (enterprise level) research with quantitative (macro/global) research will provide a rich evidence base for further policy and programme development in the manufacturing sector.

¹⁰⁴ <https://devtracker.dfid.gov.uk/projects/GB-1-202939>

- Specific MEL research on manufacturing-specific programme targets and economic indicators in the subsector (paragraph 4.1).

Evaluation and comparison of this data would allow for the assessment of programme impact, value for money and the assembly of broader insights about the characteristics of, and opportunities and trends in manufacturing subsectors in each country. The engagement of the DFID Research and Evidence Division on manufacturing programmes could be an interesting option in this respect.

5.3 External coordination with other donors and MOs

Other donors and MOs work in a broad range of comparable activities in supporting manufacturing. There is no formalised overarching coordination framework between these organisations. DFID is well positioned to set up a coordination initiative.

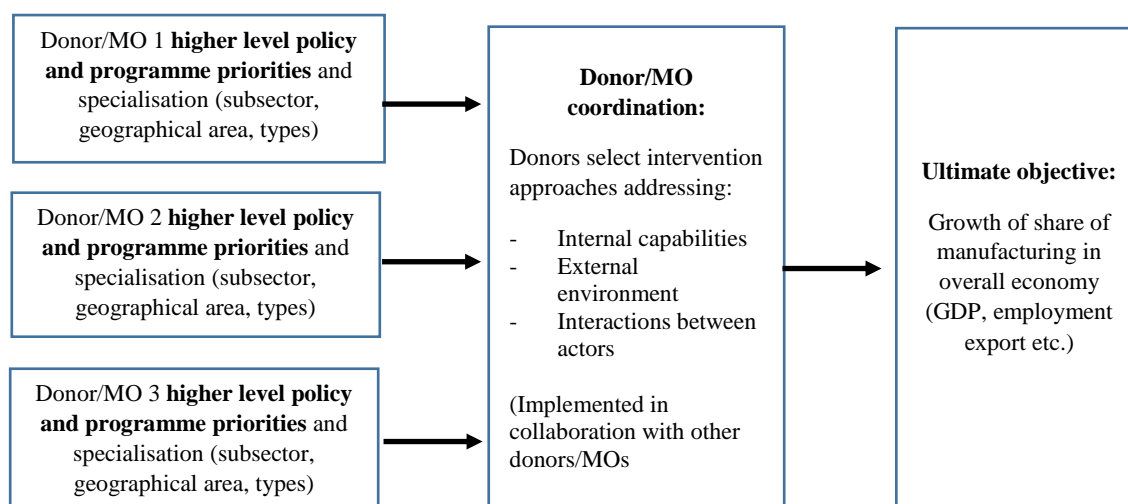
As described in the previous chapters, manufacturing support programmes best combine various inputs, addressing a comprehensive set of selected binding constraints, in order to achieve manufacturing specific targets. In the actual design and implementation of various support activities, there may be consideration as to whether DFID is the best positioned to provide the required support itself. A partnership with other donors or MOs drawing on complementary strengths may bring potential advantages, taking into consideration the respective core competencies of different donors.

Under the DFID manufacturing programmes portfolio review, a separate report was produced in which a comparison of donor and MO support approaches is presented. The report shows that all the donors and MOs work in a broad range of comparable areas and activities in manufacturing support. Some donors have particular strength and experiences and have developed particular approaches for instance on industrial policy formulation (EQiUP of GIZ/UNIDO) or enterprise level support (kaizen JICA).

At present, there are a number of combined efforts and co-financing arrangements involving DFID and other donors and MOs. However, there is no formalised overarching coordination framework to agree on coherence and complementary input frameworks for instance. Against the background of a comprehensive approach, it is advisable to promote further coherence among donors' and MOs' manufacturing support programmes with a view to specialise and complement each other. For this it is essential to agree on both higher-level policy and programme priorities in targeted subsectors and countries on the one hand, and individual strengths and related inputs on the other.

Table 8 suggests a cooperation model that distinguishes between higher-level policy and programme priorities of each donor and the intervention approaches. Once the higher-level policy and programme priorities are clear and agreed, then donors individually can design their programmes that eventually lead to the commonly agreed ultimate objective: growth of the share of manufacturing within a country's overall economy (GDP, employment export, etc.).

Figure 4: Cooperation model with other donors/MOs



Annex A: Revealed Comparative Advantage methodology

Comparative advantage is calculated from RCA defined as the share of an exported product in total exports relative to the share of the same product in total world exports. An RCA greater than 1 indicates that the exporter has a comparative advantage in exporting a particular product; and RCA of 1 implies that the exporter has no particular advantage relative to the world in exporting the products, whereas an RCA of less than 1 indicates that the exporter is not competitive relative to the world in exporting that product.

Balassa's definition says that a country is an effective exporter of a product if it exports more than its "fair share," or a share that is at least equal to the share of total world trade that the product represents (RCA greater than 1).¹⁰⁵

One example: In 2010, soybeans represented 0.35% of world trade with exports of \$42 billion. Of this total, Brazil exported nearly \$11 billion of soybeans. Since Brazil's total exports for that year were \$140 billion, soybeans accounted for 7.8% of Brazil's exports. By dividing 7.8% / 0.35%, we find Brazil has an RCA of 22 in soybeans, meaning Brazil exports 22 times its "fair share" of soybean exports so we can say that Brazil has a high revealed comparative advantage in soybeans.

Technical breakout

Formally, if X_{cp} represents the exports of product P by country C, we can express the RCA that country C has in product P as:

$$\text{RCA}_{cp} = \frac{X_{cp} / \sum_c X_{cp}}{\sum_p X_{cp} / \sum_c \sum_p X_{cp}}$$

Or simply:

$$\text{RCA}_{cp} = \frac{X_{cp} / \sum_c X_{cp}}{\sum_p X_{cp} / \sum_c \sum_p X_{cp}}$$

¹⁰⁵ Balassa, B. 1965. Trade liberalization and 'revealed' comparative advantage. *The Manchester School of Economic and Social Studies* 33: 92-123.

Annex B: Industrial development bank – the case of Ethiopia

The history of the Development Bank of Ethiopia (DBE) traces back to the early 20th century. After numerous reforms, the bank was re-established in 2003 as part of the 2003 Industrial Development Strategy (IDS). Since then it has become the financial arm of the State, allocating loans to projects in industries selected by the government. Indeed, one of the peculiarities of this bank is its project-based form of financing. In 2011, DBE was one of 15 banks operating in the country. The strong link between the government and the bank is evident: the bank finances the industries identified by the government, and the board of directors that runs the bank is composed of seven senior government officials. While DBE's annual reports do not provide data on loans disaggregated by industry, a list of the major projects financed by the bank is provided. Two examples from the manufacturing industry exemplify the bank's activities and its role in industrial policymaking.

The bank finances the expansion projects of various textile firms, a key industry in the government's industrial plans. The low wages of the Ethiopian workforce, especially when compared with the rising wages in Asian countries such as China, are attracting various renowned international firms to source inputs and intermediate goods from Ethiopia. The expansion projects of both international and domestic textile firms have been financed by the DBE. The bank does not only support the textile industry by financing projects to expand the production of garments, but also the inputs required for production. For instance, chemicals are needed to treat cotton. These are generally imported, which is the reason why DBE supports firms that are willing to produce these in Ethiopia.

Ethiopia has been growing rapidly over the last decades and its expanding industrial sector is attracting labour from rural areas. As a result of the housing boom, further sustained by the government-promoted housing programmes, construction has been among the fastest growing industries in the economy. DBE also plays a role in this important industry by financing expansion programmes of cement producing firms.

Sources: Gebreeyesus (2013), DBE (2013) and Lenhardt et al. (2015).

Annex C: Growth diagnostics according to Hausmann, Rodrik and Velasco

(Source: Hausmann, R., D. Rodrik and A. Velasco. 2005. Growth Diagnostics. Growth Lab Harvard University <https://growthlab.cid.harvard.edu/publications/growth-diagnostics-0>)

The impact of growth-promoting policy reforms is heavily dependent on circumstances. Policies that work in some places may have weak, unintended, or negative effects in others. In this paper, Hausmann, Rodrik and Velasco argue that this calls for an approach to reform that is much more contingent on the economic environment, but one that also avoids an ‘anything goes’ attitude of nihilism. The key step is to develop a better understanding of how the binding constraints on economic activity differ from setting to setting. This understanding can then be used to derive policy priorities, in a way that uses efficiently the scarce political capital of reformers.

While development is a broad concept entailing the raising of human capabilities in general, the authors believe increasing economic growth rates is the central challenge that developing nations face. Higher levels of living standards are the most direct route to achieving improvements in social and human indicators. Reform strategies should be principally targeted at raising rates of growth.

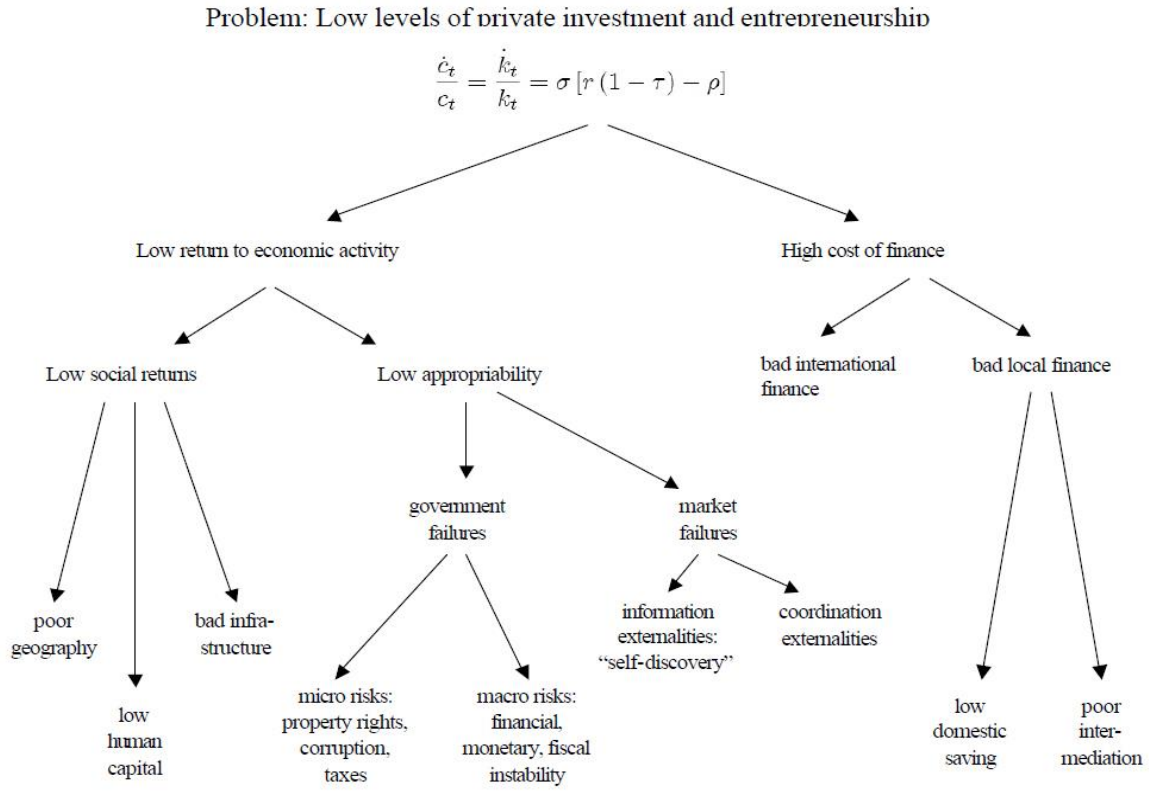
Moreover, trying to come up with an identical growth strategy for all countries, regardless of their circumstances, is unlikely to prove productive. Growth strategies are likely to differ according to domestic opportunities and constraints. Across-the-board reform packages have often failed to get countries growing again.

Lastly, it is seldom helpful to provide governments with a long list of reforms, many of which may not be targeted at the most binding constraints on economic growth. Governments face administrative and political limitations, and their policy-making capital is better deployed in alleviating binding constraints than in going after too many targets all at once. So, growth strategies require a sense of priorities.

The method for growth diagnostics the authors provide in the paper should help target reform on the most binding constraints that impede growth. An approach to development that determines the action agenda on the basis of these signals is likely to be considerably more effective than a laundry-list approach with a long list of institutional and governance reforms that may or may not be well targeted on the most binding constraints to growth.

The methodology can be conceptualised as a decision tree (see Figure 5, see below). It starts by asking what keeps growth low. Is it inadequate returns to investment, inadequate private appropriability of the returns, or inadequate access to finance? If it is a case of low returns, is that due to insufficient investment in complementary factors of production (such as human capital or infrastructure)? Or is it due to poor access to imported technologies? If it is a case of poor appropriability, is it due to high taxation, poor property rights and contract enforcement, labour-capital conflicts, or learning and coordination externalities? If it is a case of poor finance, are the problems with domestic financial markets or external ones? And so on.

Figure 5: Growth diagnostics according to Hausmann, Rodrik and Velasco (2005)



Annex D: Global Value Chains

Today, most manufacturing activities and analysis takes place in the context of global value chains (GVCs). Consequently, DFID and other donors' programme designs and theories of change aim to strengthen the position or elaborate the functioning of targeted manufacturing enterprises within value chains¹⁰⁶. Understanding the broader chain context is critical to developing the programme ambitions accordingly. The ILO Value Chain Development Cycle tool suggests being explicit about the value position for setting ambitions and targets.¹⁰⁷

There are two types of GVCs involved in most programmes of DFID, donors and MOs:

1. Promoting foreign direct investment (FDI)-based production units in global value chains (e.g. textiles, electronics, and pharmaceuticals). The product design and marketing typically take place elsewhere.

These GVCs offer the possibility to create links with UK businesses, as well. The recipients of DFID support become UK trade partners in GVCs. The combination of support and creating commercial links with UK firms can benefit both the developing country and the UK. The Dutch government and USAID, for example, include mechanisms to link business partners from their countries to overseas partners in developing countries.

2. Agro-processing units of primary products in local food and agricultural products value chains. Such value chains involve locally produced agriculture as raw material inputs. Support for the manufacturing industry is integrated into agriculture development.

By comparing the DFID manufacturing portfolio (83 programmes) with its agriculture portfolio (71 programmes), it shows that the 23 overlapping programmes do not focus much on economically transformative activity; rather they promote livelihood opportunities and non-transformational types of activity. The overlapping programmes are not focused on transforming agriculture enterprises into manufacturing enterprises. Most programmes integrate manufacturing into the agricultural activities as extra income generating activities for households.

¹⁰⁶ Gereffi, G., Humphrey, J. and Sturgeon, T. (2005) The Governance of Global Value Chains. *Review of International Political Economy*, 12, 78-104.

¹⁰⁷ https://www.ilo.org/empent/areas/value-chain-development-vcd/WCMS_615604/lang--en/index.htm

Annex E: Further references

Cases of manufacturing firms in Africa:

- <https://www.youtube.com/watch?v=pewGctAG1sY>
- <https://www.youtube.com/watch?v=WyFRjnVLGRk>
- https://www.youtube.com/watch?v=W1uv2_a5pxg

Higher-level industrial and manufacturing policies

Other donors and MOs emphasise the importance of a solid framework of higher-level industrial and manufacturing policies. Acknowledging the importance of long-term industrial strategies at the highest policy level is critical for manufacturing promotion, according to the many insights and experiences of donors and MOs. The related technical assistance includes support to national institutions to implement trade and investment frameworks and to refine national industrialisation plans. This includes harmonisation and coordination of the government's overall industrialisation, private sector, export support policies and programmes to name but a few. Several organisations supported by DFID manufacturing programmes, such as the International Growth Centre (IGC), prioritise specific industrial sectors and develop industrial/manufacturing policies accordingly.

Table 7: Industrial policies on low income countries.

Policy domain	Instruments	
	Market-based	Public goods/direct provision
Product market	Import tariffs, export subsidies, duty drawback, tax credit, investment/FDI incentives	Procurement policy, export market information/trade fairs, linkage programmes, FDI country marketing, one-stop shops, investment promotion agencies.
Labour market	Wage tax credits/subsidies, training grants	Training institutes, skills councils.
Capital market	Directed credit, interest rate subsidies	Loan guarantees, development bank lending
Land market	Subsidised rental	Eps, SEZs, infrastructure, legislative change,

Source: Weiss (2015)

Stimulate firm-level innovation

Innovation is critical for the promotion of the manufacturing sector in LMICs. Manufacturing firms have to innovate and reposition to meet international competitiveness challenges. Even small-scale innovations are relevant, including incremental adoption and adaptation of new combinations of existing technologies. Enterprises adopt technologies that are relevant to the stage of development of the economies in which they operate. Innovation is often seen as carried out by highly educated labour in R&D-intensive companies with strong ties to leading centres of excellence in the scientific world. Seen from this angle, innovation is a typical “first world” activity. There is, however, another way to look at innovation that goes significantly beyond this high-tech picture. In this broader perspective, innovation – the attempt to try out new or improved products, processes or ways of doing things – is an aspect of most if not all economic activities. In this sense, innovation may be as relevant in the developing part of the world as elsewhere. As described in emerging innovation theories on LMICs, much innovation depends on an aggregation of small insights and advances through ‘learning by doing’, and frugal and inclusive technological innovation, rather than on major technological inventions (Carayannis et al., 2003).

For the introduction of new technologies, developing countries can turn their backwardness into an advantage by borrowing or adapting technologies that have already matured in richer economies.

Strengthen technical as well as managerial skills

Strengthening the internal capabilities of manufacturing enterprises is an important area of attention in meeting the ‘premature de-industrialisation’ challenge. Industry 4.0 or the profusion of modern process technologies associated with the new production paradigm powered by robotics and labour-saving technologies seem likely to hinder developing countries in expanding their share in global manufacturing. Moreover, a rapid ‘servicification’ of the manufacturing sector is taking place. This changes the nature of the sector and requires more technically skilled and savvy workers, who take ownership and control in developing new future manufacturing approaches. In the long run, it is not expected that the manufacturing sector will offer labour-intensive growth opportunities.

Although in the short term it is expected that a lot of labour-intensive work will be required in manufacturing, the outlook for the long run is a development towards more advanced technical as well as managerial skills. It involves a combination of the exposure to modern technologies and an entrepreneurial and creative attitude to finding manufacturing solutions. As one example, JICA stresses the importance of improving the management and production (quality) capability of firms via Japanese business concepts such as *kaizen* (continuous improvement). Human resource development is often not exclusively geared toward manufacturing. This refers to providing education and training for entrepreneurs and workers with a view to strengthening management and production quality capabilities.

Capital accumulation

In the DFID document ‘Economic Development Strategy: prosperity, poverty and meeting global challenges (January 2017)’, it is proposed that the City of London can become a leading financial centre for the developing world.